Department of Mental Health

Phase I – CIMOR Evaluation
(Technical, Functional, and Operational)

Health Check of the Current State of the Project

Deliverables #1 – #7

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Appendix A

1 Executive Summary

Fox Systems, Inc. (FOX) was engaged by the Mental Health Commission and Information Technology Services Division (ITSD) to conduct a review of the current health of the Customer Information Management Outcomes and Reporting (CIMOR) Project. The evaluation took place between August 6 and September 28, 2007.

Phase I of the project includes an in-depth review of the current "As Is" state of the CIMOR Project and system. As part of this review, FOX conducted interviews with executives who were asked to envision how the Department of Mental Health (DMH) will function 5 to 10 years into the future. Additionally, executives, business owners, the DMH ITSD staff, and providers were interviewed to identify CIMOR project goals and objectives, review business processes, and to gain a first hand understanding of perceived CIMOR system strengths and weaknesses.

FOX wants to thank all those who participated in the assessment. All of the DMH staff, especially the ITSD staff, were extremely helpful, open, and cooperative in making available their documentation and their personnel to assist in this review.

This report explains in detail what CIMOR system does and how this is perceived by three of its stakeholders: ITSD, DMH business owners, and DMH providers; provides an analysis of the current technical environment (hardware and software); and reviews the CIMOR's billing/claims processes and capabilities. An analysis of the current CIMOR implementation project compared to industry best practices for implementation of large complex systems is also provided and includes a review of CIMOR project management approach, risk management, and results of the lessons learned facilitated session as expressed by participating CIMOR implementation members.

Phase II of the project will look at other Commercial-Off-The-Shelf (COTS) products available in the marketplace with the same or similar functionality to CIMOR, as well as other options available to DMH (e.g. collaboration with other state agencies) to meet its information needs. Finally, FOX will conduct a cost benefit analysis of selected viable options and make recommendations to the Department on a strategic plan for addressing future information technology needs.

1.1 Background

Prior to September 1999, the DMH used approximately 15 legacy systems to support their three business divisions, and most of these legacy systems were being processed on the ITSD mainframe or AS 400s. The objective for CIMOR was to replace these15 legacy systems with one system that would integrate data from all divisions and make it viewable to authorized users.

In September 1999, the DMH issued a Request For Proposal (RFP) for a computer system to replace, enhance, and integrate the various clinical, financial, and administrative systems used throughout the department. This system was named Customer Information Management, Outcomes and Reporting (CIMOR). CIMOR's goal was to provide for the intake and tracking of consumers, maintenance and tracking of department funding and program expenditures,

recording of clinical encounters, generating claims for payment when appropriate, and conformance to Federal requirements for security, privacy, and electronic transactions.[1]

In addition CIMOR was, and is supposed to be, the enterprise system that is to support all the facilities, providers, and regional offices. Furthermore, CIMOR was and is to provide a data warehouse for conducting performance analysis, preparing and monitoring grants, providing decision support capabilities for both clinical and administrative functions within DMH, and providing outcomes reporting.

A vendor was selected and a contract awarded in September 2000 to develop CIMOR. For various reasons the contract was cancelled in 2002, and beginning in March 2003 the ITSD became responsible for all development and implementation of CIMOR.

1.2 Assessment Objectives and Goals

The objective of this high-level assessment is to determine the current "As Is" state of the CIMOR project and system. The Department is not interested in identifying all past issues of a prolonged system implementation (2000 to 2007), but rather to focus on the current status of the project and system; compare project management and risk approaches to industry best practices, and to identify for the Department those best practices that will assist the Department in ensuring the success of future implementations.

1.3 Scope of the Assessment

The scope of the assessment was limited to a high-level review of the system and project management processes, consisting of interviews with selected individuals and groups to gather perceptions on CIMOR and how well CIMOR meets its users needs; review of system documentation and project management implementation artifacts, and the current ITSD policies/ procedures and standards; a walkthrough of the ITSD Data Center where the CIMOR production hardware is housed; several demonstrations of CIMOR billing applications and data warehouse capabilities.

As part of the review, FOX consultants developed three questionnaires (see Appendix A) to gather perceptions about the CIMOR system implementation from ITSD Management, DMH business owners, and providers (end users of the system), and assess these groups' perceptions about how well CIMOR system is meeting their current business needs.

The DMH interview groups included:

- DMH executive management: 10 individual interviews
- DMH business owners: 7 individual interviews
- ITSD technical staff: 4 group interviews, as follows: 1) ITSD Management – Project Manager and Department Information Technology (IT) Director; 2) IT Data Warehouse and Reporting Team; 3) IT Technical/Network Team; and 4) The CIMOR Development Team.

[1] State of Missouri Office of the State Auditor, "Mental Health Office of Information," Report No. 2005-36, June 2005, p. 5.

Interviews were also conducted with six outpatient provider entities that use CIMOR in order to obtain their perspectives on the system. Five of these providers were selected by the DMH business owners and one provider contacted FOX consultants directly asking to be interviewed. One provider organization, the Missouri Coalition of Community Mental Health Centers, was also interviewed. The Coalition had collected surveys from 23 of its members, 18 to 20 of the largest Comprehensive Psychiatric Services (CPS) providers, the majority of whom also provide Alcohol and Drug Abuse (ADA) services, and averaged the responses for their interview. These responses actually represented a larger number of providers' responses than the number of interviews conducted. The providers interviewed included the following:

- Family Counseling Center of Missouri, Inc. (ADA programs)
- Pathways Behavioral Healthcare (CPS programs)
- Gibson Recovery Center (ADA programs)
- Preferred Family Healthcare, Inc. (ADA and CPS programs)
- Jefferson County Developmentally Disabled Resource Board (Mental Retardation and Developmental Disabilities (MRDD) programs)
- Queen of Peace Center (ADA programs)

1.4 Limitations of the Assessment

FOX gathered pertinent historical artifacts to glean an understanding of the CIMOR implementation project planning and management approaches, work plan, communications plan, etc. as well as current information on project management approach and other project and system artifacts with the assistance of ITSD. Because the focus of the assessment was CIMOR project and system "As Is," it was determined that business owners who participated in the system requirements definition and testing of CIMOR, and ITSD staff currently involved in the development and operations of CIMOR, would be appropriate for interviews. All DMH executives (or designees) were interviewed to ensure an accurate perception of the Department's future strategic goals and to determine their planned/desired system functionality necessary to support these goals.

The DMH business owners selected providers for participation in the interviews. Providers were representative of all three DMH divisions - Alcohol and Drug Abuse (ADA), Comprehensive Psychiatric Services (CPS), and Mental Retardation and Developmental Disabilities (MRDD), and represented small and large providers located throughout the State of Missouri. In as much as a valid random sampling technique was not used for interviewee selection, the results would neither be considered statistically valid nor are they meant to portray the perceptions of all providers using CIMOR at this time.

The timeframe for completing the review was a short six-week period with four consultants assigned to this effort. Thus it was not feasible, nor was it necessary, to review all system requirements, design documents, test results and project management documents to complete the high-level assessment.

1.5 Summary of Key Findings

There were a number of themes that surfaced as opportunities for improvement throughout the independent assessment review process. To facilitate the review of the document, a summary

of the primary themes is provided in this section in conjunction with references identifying where to find detailed information on the specific theme within the document.

Theme #1: The CIMOR system is functional and in operation.

Approximately 81% of the originally planned functions of CIMOR have been made operational, and CIMOR has successfully replaced several older obsolete legacy DMH systems.

Most providers perceived the system foundation as sound, the screens are fairly easy to navigate, and where the system works, it works reasonably well, problems are being resolved and functionality is improving. When claims/encounters are accepted into the system and there is no reason to void or re-bill the claim, the process works.[2] Much of the current user dissatisfaction is associated with the delay in completion of some CIMOR functions. This causes the need for duplicate entry in CIMOR as well as in some legacy systems for the interim period until the CIMOR functionality will be implemented to replace the legacy systems.

The ADA business owners perceive the system as working very well. ADA is the only division that has fully adopted CIMOR at this point in time, including the claims processing functionality. The business rules ensure all data needed to support the grant are entered into the system and business rules that have been included in provider contracts are being enforced. Providers are monitored and the system keeps spending within approved consumer budgets.

Given the resources, budget limitations, and major competing IT initiatives such as HIPAA, Access To Recovery (ATR), and Organized Health Care Delivery System (OHCDS) during the course of developing and implementing CIMOR, ITSD has done a commendable job of implementing a complex enterprise-wide system replacing several legacy systems using new technology.[3]

Theme #2: CIMOR Architecture is appropriate current technology.

An early decision to use a web-based deployment and Microsoft software (the .NET framework) demonstrated great foresight on the part of DMH ISTD. That decision has positioned CIMOR well for maintainability and expandability on a current technology platform. The three-tier architecture, the hardware utilized, and the Microsoft .NET framework are industry-standard approaches to this type of business application. Scalability in terms of hardware and software to support DMH business needs for the next several years does not appear to be an issue, as long as sufficient funding and adequate support staff expertise are maintained.[4]

Theme #3: There are differing perceptions of how well CIMOR works depending upon who was interviewed.

The business owners perceive that CIMOR has been successful in enforcing compliance by providers with business rules that have not been previously enforced. This is expected to ensure better data within the system for required reporting and to enable demonstration of conformance with the requirements of funding authorities.

[2] Refer to Section 3.2.4 for further details.

[3] Refer to Section 2 “Status of CIMOR” Section 3.4 “Perceptions on CIMOR Business Processes Ability to Meet DMH Needs,” and Section 3.5 “CIMOR Strengths and Weaknesses” for additional detail.

[4] Refer to Section 5 “Technical Review of Hardware Architecture” and Section 6 “Technical Review of Software Architecture” for additional information.

The providers are less satisfied because a much higher level of business rule process enforcement is now required from them and because the transition to the new system was primarily to address the needs of DMH and not to facilitate their business processes. To complicate matters for providers, there were initially system problems that caused them to develop a backlog of encounter entries which slowed their cash flow. Also, some providers must still use a DMH legacy system for some activities and CIMOR for others.

The ITSD system developers view CIMOR as a quantum technological improvement that accomplishes the primary objectives of integrating the functionality of many older technology systems into an enterprise-wide system. They feel that the functions that have been specified to be incorporated into the system have been accomplished.[5]

Theme #4: Provider billing delays were a result of multiple factors.

The problems of the initial CIMOR implementation that contributed to providers experiencing billing delays were varied, and not all were related to system performance. The system did have performance problems and design and coding errors. There were data quality problems such as missing and bad data carried over from conversion of legacy system files without much corrective assistance from system users. The business initiative to systematically enforce complex business rules not previously enforced, and the plan to implement the encounter processing without a void and re-bill process operational at the outset contributed to the problems.[6]

Theme #5: The agency and end users expressed a strong need for an easy-to-use reporting capability.

Even though the current CIMOR system has a data warehouse capability, it is not considered to be an easily understood and usable tool for performing ad hoc reporting. Users expressed a need for more intuitive business intelligence software tools and a simpler data table structure that is optimized for ease of query and retrieval.[7]

Theme #6: Agency executive turnover and the lack of a project sponsor had a profound influence on the CIMOR project.

The CIMOR project has not had an executive sponsor high enough in the Department to maintain ongoing support and continued direction of the project. Even though the CIMOR project has continued as a recognized agency initiative for several years, frequent turnover of agency directors and high-level executives has resulted in different priorities and varying levels of funding and resource allocation over that time period. The ITSD project managers have been the most consistent supporters of the project, but a dedicated administrator high enough in the

[5] Section 3.4 “Perceptions on CIMOR Business Processes Ability to Meet DMH Needs” has comments from interviewees showing different perceptions of CIMOR. The section also presents these differing perceptions quantitatively (i.e., numerically) using tables and charts.

[6] Section 3 “Interviews with CIMOR Key Stakeholders,” and Section 9 “Review of CIMOR Implementation” contains additional information.

[7] Section 3.4 “Perceptions on CIMOR Business Processes Ability to Meet DMH Needs” has several tables which present comments that characterize how users perceive the system and its use. Several of these comments indicate the need for an easy to use ad hoc query and reporting system. Interviewees also identified this as one of CIMOR’s weaknesses in Section 3.5 “CIMOR Identified Strengths and Weaknesses.”

organization to secure funding, articulate the necessity of the system, and keep the project on path is needed.[8]

Theme #7: Lack of a comprehensive high-level project plan prevents stakeholders from having a clear roadmap of the remainder of the CIMOR project.

Since the time of the initial CIMOR implementation almost a year ago, the CIMOR project managers have not maintained the formal project plan they had previously used to manage the project. The personnel who had served in the project management office capacity have been substantially re-directed to problem resolution and system stabilization activities. The CIMOR project managers have not developed and published a detailed project plan showing all the components yet to be implemented and the activities, resources, and task durations needed to complete the system. This has prevented development of a realistic long-term schedule and has prevented all the stakeholders from knowing how the development will be undertaken.[9]

Theme #8: The initial CIMOR implementation lacked sufficient testing prior to implementation.

Industry best practices for implementation of large complex systems, such as CIMOR, would include development of a test plan, identification of structured test scenarios and test cases; conducting extensive system testing, development of a robust test environment; use of automated test tools, and thorough stress/load tests followed by end-to-end tests prior to system implementation. These practices were not rigorously followed prior to the initial implementation of the CIMOR system. There are budget items to acquire additional testing and diagnostic tools and implement supporting methods in FY '08.

Some CIMOR implementation activities perceived as not going well were negatively affected by external pressures, not under the control of the implementation team. These included management decisions, such as resource and staffing cuts, and management defined non-negotiable deadlines. As a result the system was implemented when not all functions were complete or fully tested, putting a burden on users to work with a rough system, and essentially testing the system through actual use. Consequently, the first priority since the implementation has been to fix system bugs as quickly as possible so that providers could use it to perform essential service and operational activities. The development of a void and re-bill process was pushed to later until the end of fiscal year was upon the department and providers.[10]

[8] Section 2.1 "Background – Description of initially defined Statement of Work (SOW)" briefly describes CIMOR's nine year history from 1999 through 2007. Section 9 "Review of CIMOR Implementation" describes situations that could have been better influenced and guided if a Project Sponsor were available.

[9] Section 7 "Review of Project Management Approach" for additional information.

[10] Section 3.2 "Interview Summaries and Identified Perceptions" and Section 3.4 "Perceptions on CIMOR Business Processes Ability to Meet DMH Needs" both discuss how by business owners and providers agree that testing was not sufficient. Section 3.2.4 "Providers" indicates that providers feel they were left out of the testing process. Section 3.5 "CIMOR Identified Strengths and Weaknesses" identifies lack of sufficient testing as one of CIMOR's weaknesses. Section 4.3 "Current Status of Billings" points out that billing process were not adequately tested. Section 9 "Review of CIMOR Implementation" discusses lack of sufficient testing as an issue for CIMOR.

Theme #9: Industry best practices identify communication with and participation from all internal and *external* stakeholders as a key factor in successful implementation of systems.

Much of the publicized dissatisfaction of providers with the initial CIMOR implementation resulted from the perception that they were not continuously included in the planning, testing, and training development. Communicating with those external stakeholders and understanding their needs would be expected to result in a system more acceptable to them and more in alignment with their business processes.[11]

Theme #10: The project team does not utilize a formal process for problem resolution.

ITSD has a formal change control management process in place but lacks a formal process for problem resolution. For example, during the interview process it was discovered that there was a performance/response time issue with CIMOR immediately following implementation of the system. A number of speculations were made (e.g., the 10 business rules caused the issue, additional hardware was needed, or the provider is or was using non-compatible hardware). More hardware was implemented and several system modifications were made. The performance/response time issues continue to decrease, but the root of the problem has not yet been definitely determined. Therefore it is indefinite whether year-end processing of outstanding claims voids and re-bills or the next expansion to additional users will overload the system again.[12]

Theme #11: There are opportunities for collaboration with other state programs, including Medicaid.

Many of DMH's healthcare initiatives depend upon obtaining information or funding from other Missouri state agencies. A large percentage of DMH's clientele are Medicaid eligible, so it is important to be able to interact with the Department of Social Services (DSS) to determine client eligibility and to submit claims for payment through MO HealthNet. DMH is involved with other social services agencies in the planning for a new children's data warehouse. Many of the future information system needs identified in this review, such as electronic health records, data warehouse reporting, and service coordination, would require sharing data or systems with other agencies.[13]

[11] Section 2.5 "CIMOR Environmental Factors" states that a communication gap is still an issue today. Section 3.2.4 "Providers" shows that providers saw a communications problem. Section 3.5 "CIMOR Identified Strengths and Weaknesses" indicates that communications is one of the CIMOR project's weaknesses. Section 9 "Review of CIMOR Implementation" raises the need for good communications.

[12] Section 2.5 "CIMOR Environmental Factors" describes issues such as the cause behind the business rules creating a provider reimbursement problem and timeouts that may expedite solutions beyond what professional experience alone could provide. Section 6.4 "Detail description of software issues" also discusses timeouts as needing resolution.

[13] Section 3.2 "Interview Summaries and Identified Perceptions" mentions SAM II and Medicaid as external data sources. Section 3.3 "DMH Vision of Future Business Needs" gives an example of the Children's Data Warehouse as a need for collaboration with other agencies. Section 3.4 "Perceptions on CIMOR Business Processes Ability to Meet DMH Needs" references the need to integrate with CyberAccess and QuadraMed. The section also expresses a need for providers to directly access data. Section 4 "Review of Billings and Processes" mention different stakeholders regarding claims reimbursement.

Theme #12: Corrective actions are underway and progress is being made in several areas.

Corrective actions were implemented with the initial CIMOR implementation and have been continuous, including corrective actions made to the system and related business processes to address concerns of the system stakeholders. Other actions include hardware upgrades to the system, revisions made to the business rules, a void and re-bill process has been implemented, and hundreds of bug fixes have been made. Plans are underway for adding multidimensional tables of pre-aggregated data to the CIMOR data warehouse to simplify and improve query and reporting. Occurrences of transaction timeouts have been dramatically reduced. The Claimbuilder system is being rewritten to be integrated into CIMOR.

The establishment of the Business Owner Group and IT Steering Committee are good practices for helping IT address the correct business needs. The Steering Committee prioritizes changes to CIMOR and all other IT projects. The Business Owner Group is responsible for communicating the needs of the business areas to the IT staff.[14]

Theme #13: The Department of Mental Health (DMH) envisions its future to be that of an oversight authority and not a direct provider of healthcare services.

Some administrators described a long-range vision of the Department as evolving into a role of being the mental health authority for Missouri rather than a direct service provider. This new role would include primary responsibilities for researching, planning, and establishing policy, contracting for mental health services, monitoring mental and behavioral healthcare, measuring results, and controlling funding. The Department's information technology needs could change from supporting billing of services and payment authorization and processing to more of a decision support engine and data mining and reporting warehouse. That transition is beyond the current scope of CIMOR development which is still oriented toward the tight integration of detailed services authorization and processing with business rules enforcement within an enterprise-wide system.[15]

[14] Section 3 "Interviews with CIMOR Key Stakeholders," Section 4 "Review of Billings and Processes," and Section 7 "Review of Project Management Approach" for additional information.

[15] Section 3.3 "DMH Vision of Future Business Needs" provides additional information regarding this theme.

2 Status of CIMOR

The status of CIMOR today is that it works, although only about 81% of its originally planned functionality is operational at this point. How well it works is a matter of perception. CIMOR does have several opportunities for improvement. Ironically, CIMOR does less than initially expected since it is only 81% complete, but more than initially envisioned since it has 16 functions not previously considered.

On first glance CIMOR appears to be an emotional issue for almost all who are touched by it. But when objectively and quantitatively evaluated, CIMOR is perceived to be neither good nor bad. Specifically providers and Department of Mental Health (DMH) business owners both with direct CIMOR experience were asked to indicate their level of agreement with some general statements about CIMOR. A sample statement is "CIMOR meets user needs." Figure 1 shows that overall DMH business owners (magenta bar) and providers (turquoise bar) have similar levels of agreement (i.e., both are "3").

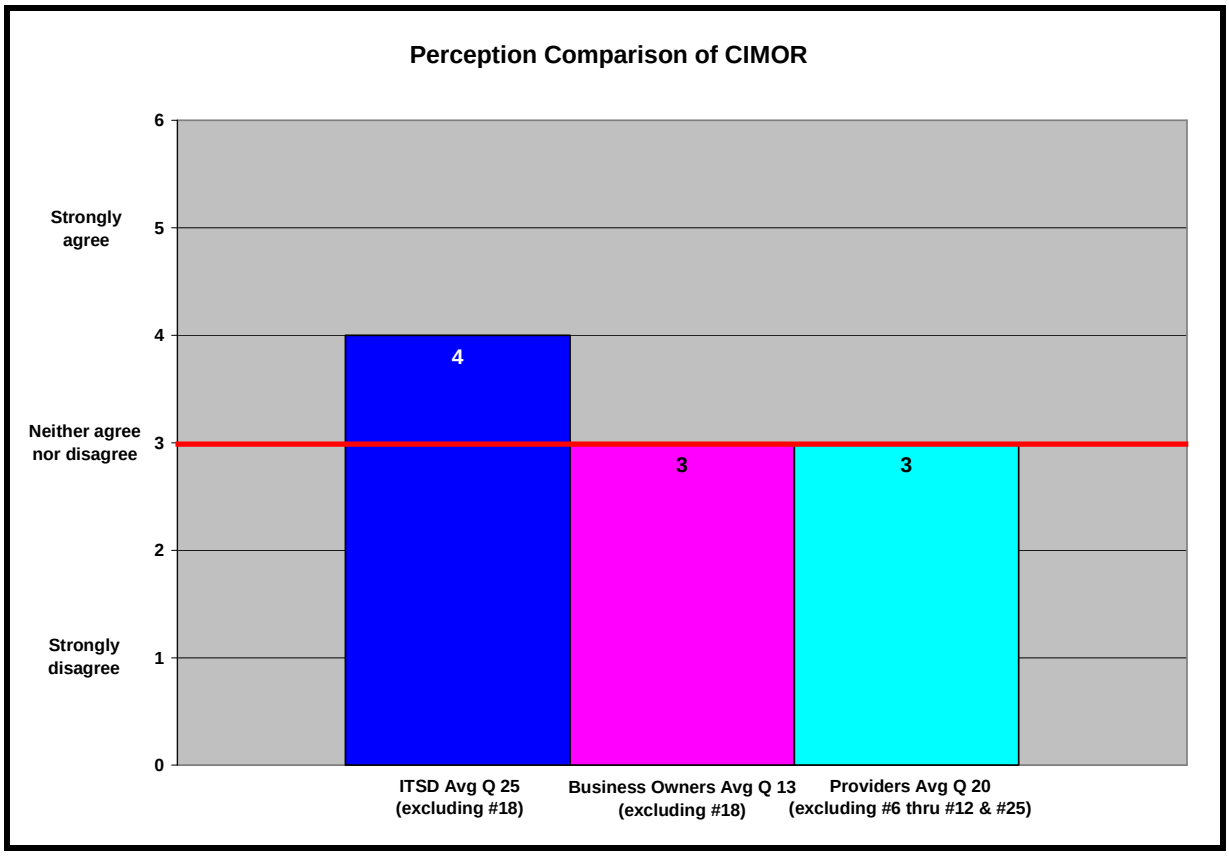


Figure 1 DMH Business Owners and Providers See CIMOR as neither Good nor Bad

Because only six (6) business owners and six (6) providers were interviewed, the sample size is not large enough to state that the values in Figure 1 are accurate enough to represent the views for all the stakeholders.

Both the DMH business owners and provider interview forms asked interviewees to express their level of agreement using the scale shown in Table 1.

Table 1 Perception Level Agreement Scoring

Strongly disagree 1	2	Neither agree nor disagree 3	4	Strongly agree 5

To make Figure 1 consistent with interviewee responses using Table 1, the MS EXCEL spreadsheet function ROUND (value, 0) was used. This same process was used on all the tables and charts in this section.

Of course CIMOR is not quite as simple as Figure 1 would imply. Today the CIMOR story is analogous to the tale of the elephant and the blind men who try to describe the elephant. The description heard depends on where each person is located. As illustrated in Figure 2 with actual interview comments, the perception one has of CIMOR depends on which side of the fence one is located.

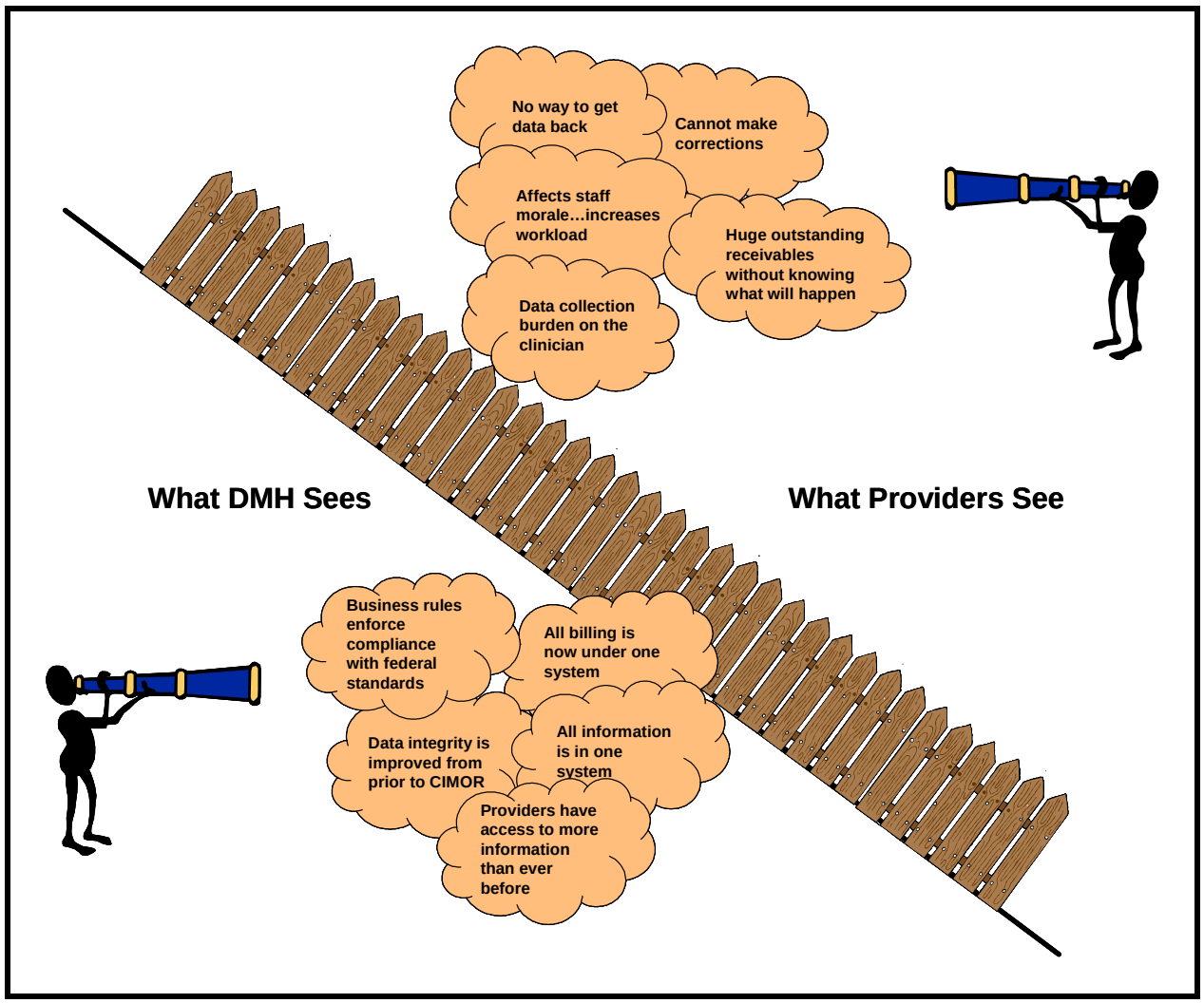


Figure 2 Where You Stand Determines What You See (Actual CIMOR Interview Quotes)

This report explains in detail what CIMOR does and how this is perceived by three of its stakeholders: Information Technology Services Division (ITSD), DMH business owners, and DMH providers.

CIMOR is a “one stop and shop” system covering a wide-range of mental health services for DMH. It supports organizational and administrative functions providing information tracking and consumer demographics. It also assists with inpatient facility management by offering bed tracking availability and bill calculation support. CIMOR provides significant support for billing based on delivery of services or “encounters,” as they are referred to in CIMOR. Typically billing has many different payers including Medicaid, Medicare, private insurance, and others. Fiscal Management, which is the disbursement of State funds, is processed and categorized through groupings such as Grant Funds, Appropriations, Allotments, and Allocations.

CIMOR also supports State facilities with Event Management & Tracking (EMT). EMT tracks incidents that may result in the compromise of a consumer’s safety. Details of incident investigation, individuals involved and follow on progress of the incident are logged into this area.

Some assessments/screenings, which are included, make the appropriate classification of consumers based on certain criteria. Both the results of these assessments and the follow-on diagnoses treatment plans are kept in CIMOR.

CIMOR is a comprehensive system developed expressly for DMH. CIMOR has evolved from its original intent as a replacement product to become much more with the introduction of 16 previously unanticipated capabilities. CIMOR has become the keystone for DMH operations.

CIMOR is 81% complete seven years (i.e., 2000 – 2007) after contract award. The very real possibility exists that CIMOR will never be completed if the baseline is the original 88 functions. The point must be made that several factors contributed to this situation. Some of these factors include the implementation team, Oversight Committee, and organizational changes. Section 2.5 addresses other of these environmental factors internal to ITSD that impacted CIMOR’s development.

CIMOR has been custom tailored to the specific needs of Missouri in general and DMH in particular. As such it is unique. The second phase of this study will among other activities determine whether it is possible to replace CIMOR with a COTS package with the same functionality.

2.1 Background – Description of Initially Defined Statement Of Work (SOW)

Prior to September 1999, the DMH used approximately 15 legacy systems to support their three business divisions, and most of these legacy systems were being processed on the ITSD mainframe or AS 400s. The objective for CIMOR was to replace these 15 legacy systems with one system.

In September 1999, the DMH issued an RFP for a computer system to replace, enhance, and integrate the various clinical, financial, and administrative systems used throughout the department. This system was named Customer Information Management, Outcomes and Reporting (CIMOR). CIMOR’s goal was to provide for the intake and tracking of consumers, maintenance and tracking of department funding and program expenditures, recording of clinical

encounters, generating claims for payment when appropriate, and conformance to federal requirements for security, privacy, and electronic transactions.[16]

CIMOR was and is supposed to be the enterprise system that is to support all the facilities, providers, and regional offices. Furthermore, CIMOR was and is to provide a data warehouse for conducting performance analysis, preparing and monitoring grants, providing decision support capabilities for both clinical and administrative functions within DMH, providing outcomes reporting, etc.

A vendor was selected and a contract awarded in September 2000 to develop CIMOR. For various reasons the contract was cancelled in 2002, and beginning in March 2003 the ITSD became responsible for all development and implementation of CIMOR.

Table 2 presents CIMOR's business functions past, present, and future. Column (2)[17] lists the 46 business functions currently (i.e., September 2007) in CIMOR listing the names users use and recognize.[18] With a few exceptions column (4) identifies 106 business functions that the initial CIMOR contract used in September 2002. Column (5) indicates whether the function listed was in the initial scope of work (SOW) statement in 2002. Column (6) shows whether the function is currently in CIMOR. Column (7) states whether the function is a planned CIMOR enhancement. Finally column (8) provides a brief description of what the function does. It should be noted that claims payments functions that are currently operational are only functional for the ADA division; the MRDD and CPS divisions continue to process their payments for services through the DMH Legacy systems. (An exception is that some CPS providers also provide ADA services, which are processed through CIMOR.)

Column (5) analysis indicates that 88 functions were identified in the initial contract scope of work (SOW). As of September 2007, 71 or 81% (81% = 71/88) of these 88 functions are currently in CIMOR. If the 13 planned enhancements were completed and implemented into CIMOR, then CIMOR would be 95% (95% = (71+13)/88) complete based on the 1999 SOW statement. One should also note that an additional 16 functions not in the initial SOW were also developed and are now in CIMOR.

[16] State of Missouri Office of the State Auditor, "Mental Health Office of Information," Report No. 2005-36, June 2005, p. 5.

[17] The reader should note that a column (2) function may be comprised of one or more column (4) sub functions or components. For example provider interview question Q #7.2 (i.e., IQ #2) is the current CIMOR business function "Accounts Payable (Adjudication)," which is comprised of the two initial contract sub functions ID #2, "Account Transactions Search," and ID #3, "Accounts Payable." Both of these sub functions were in the initial contract SOW ("Yes" in column (5)). Therefore, because of this fact "Accounts Payable (Adjudication)" is currently in CIMOR ("Yes" in column (6)). Since "Accounts Payable (Adjudication)" is already present and no enhancements are planned, column (7) contains "N/A" for "Not applicable."

[18] Table 2 column (2) was used as the basis for the interview forms. After all interviews were conducted, the discovery was made that IQ #28 "Medical Record Maintenance" is not currently in CIMOR with full formal medical record capabilities. The assumption has been made that respondents referenced the existing CIMOR medical presentation screens and / or other consumer details that are included and related to medical records but do not constitute a complete medical record. An additional function included on the interview form but missing from CIMOR is IQ #20 "DMH Intra-agency Communication."

Table 2 CIMOR Business Functions Past, Present, and Future

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
1.	Access to Recovery (ATR)	1.	Access to Recovery (ADA ATR)	No	Yes	Yes	Administration and implementation of business rules to support the ADA grant for Access to Recovery, including voucher management and services delivery.
2.	Accounts Payable (Adjudication)	2.	Account Transactions Search	Yes	Yes	N/A	Ability to search all payment transactions for details of payments
		3.	Accounts Payable	Yes	Yes	N/A	Delivered services receive appropriate edits, check business rules, find appropriate payer plan and prepare HIPAA-compliant claims for payers and non-HIPAA compliant transactions to SAM II.
3.	Accounts Receivable (Claims Processing)	4.	Billing/Claims (Financial Clearinghouse)	Yes	Yes	Yes (Medicare & Insurance claims automation in future)	Claims processed in HIPAA-required EDI format to Medicaid, Medicare, Insurance companies. Claims processed in non-HIPAA format to SAM II.
		5.	Claims Search	Yes	Yes	N/A	Ability to search through claims information to find details of submissions and payments
		6.	External Claims Search	Yes	Yes	N/A	Ability for providers to search claims information for details of services submitted and paid
		7.	Accounts Receivable (Financial Clearinghouse)	Yes	Yes	N/A	State facility delivered services into HIPAA-compliant claims for appropriate payers (Medicaid, Medicare, insurance). Claims processing in HIPAA-required EDI format.
		8.	Accounts Receivable	Yes	Yes	N/A	Accept non-HIPAA claims from SAM II for consumers, guardians, consumer banking and families for services provided.

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
		9.	Payment Search	Yes	Yes	N/A	Ability to search payments and tie back to claims/invoices and services billed
		10.	Payment Receipt with Adjustments	Yes	Yes	N/A	Interface with SAM II to retrieve payment check and data.
		11.	Account Transactions Search	Yes	Yes	N/A	Ability to search transactions to determine balance of accounts
		12.	BizTalk 835 Receive EOB (required fields)	No	Yes	N/A	Receive HIPAA 835 based on professional services/claims processed by payers
		13.	BizTalk 837 Receive Professional Claim	No	Yes	N/A	Receive HIPAA 837 Professional services claims from batch providers
4.	Administration (code tables and setups)	14.	Internal Service Code Management	Yes	Yes	N/A	Administration of code tables and edits, including service categories, service types, diagnosis groups.
5.	Assessments	15.	Assessments	Yes	Yes	N/A	Variety of assessments to be determined.
		16.	State Reporting Assessment	Yes	Yes	N/A	Support assessments data required for state reporting
		17.	Clinical Intake Screening	Yes	Yes	N/A	High-level screening upon enrollment to determine if consumer has service needs across DMH divisions.
6.	Authorization / Request / Approval / Review	18.	Treatment Authorization Request	Yes	Yes	N/A	Consumer-specific service authorization request to DMH. Non-consumer specific administrative and shadow claims.
		19.	Treatment Authorization Approval	Yes	Yes	N/A	Authorization approval and utilization review processes. Budget info for ISL to create service authorizations and document for SCL providers.

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
7.	Benefit Eligibility	20.	Eligibility	Yes	Yes	N/A	Determination of benefits and financial eligibility. Medicaid eligibility data retrieval from Dept. of Social Services files currently retrieved from MEIS. Social Security Administration retrieval of SSN verification process.
8.	Case Management	21.	Consumer Group Management	Yes	Yes	N/A	Schedule of consumer visits or treatment appointments in group settings.
		22.	Caseload Management	Yes	Yes	N/A	Case managers' ability to view regular consumers, enter service logs, and print consumer lists.
9.	Claims Adjudication and Payment	23.	Service Processing Log	Yes	Yes	N/A	Ability to see services processed through details of claims and payments made
		24.	Billing/Claims (Financial Clearinghouse)	Yes	Yes	N/A	Claims processed in HIPAA-required EDI format to Medicaid, Medicare, Insurance companies. Claims processed in non-HIPAA format to SAM II.
		25.	Claim Form with Adjustments	Yes	Yes – in process	N/A	Ability to adjust claims with void functionality and re-bill capability
		26.	Claims Adjudication	Yes	Yes	N/A	Explanation of Benefits requirements and display of eligibility information. Ability to link back to Medicaid services and enter as delivered services for CPR Medicaid Program.
		27.	Payment Search	Yes	Yes	N/A	
		28.	Payment Receipt with Adjustments	Yes	Yes	N/A	Interface with SAM II to retrieve payment check and data.

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
10.	Claims Data Entry and Capture	29.	Encounter Reporting (Delivered Services)	Yes	Yes	N/A	Ability to report on all services delivered to a consumer
		30.	EOC Service Entry	Yes	Yes	N/A	Delivered service data entry for both authorized and non-authorized services. Includes case management notes field. Ability to add multiple services and service categories for one or several consumers.
		31.	Services Management	Yes	Yes	N/A	Ability to enter and make corrections to services delivered to each consumer
		32.	Claim Form with Adjustments	Yes	Yes – in process	N/A	Ability to submit claims for service payment and make adjustments through void and re-bill as needed
11.	Claims Error Resolution	33.	Service Processing Log	Yes	Yes	N/A	Ability to see services details and any changes made to services for billing
		34.	External Claims Search	Yes	Yes	N/A	Ability for contract providers to see claims entered and submitted
12.	Clinical Intake Screening	35.	Clinical Intake Screening	Yes	Yes	N/A	High-level screening upon enrollment to determine if consumer has service needs across DMH divisions.
13.	Complex Allocation Management	36.	Fund Management (Allocations)	Yes	Yes	N/A	Maintenance of SAM II appropriations and other required data for payment. Allocating DMH funds (through payer plans and service categories) to enrolling DMH and contract providers.
14.	Consumer Banking	37.	Client Banking	Yes	Yes	Yes (1099)	Management of consumer funds held in trust by state-owned facilities. Includes deposits (manual and electronic), withdrawals, transfers, calculation of interest, and 1099 preparation/submission.

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
15.	Management of Consumer Demographics	38.	Consumer Demographics	Yes	Yes	N/A	Management data distribution of consumer demographics and check printing
		39.	Face Sheet Summary	Yes	Yes	N/A	Printable summary of consumer demographics for record
16.	Contact Management	40.	Contact Log	Yes	Yes	N/A	Contact management to track details of calls or visits to consumers
17.	Co-Pays that are not ATP	41.	Includes SATOP fees	No	Yes	N/A	Apply SATOP fee to SATOP services. All consumers entering SATOP must pay both a $120 assessment screening fee at the time of their appointment and a $125 supplemental fee at the time of their assessment.
18.	Delivered Services (Encounter Data Entry)	42.	Encounter Reporting (Delivered Services)	Yes	Yes	N/A	Ability to report on services delivered to a consumer
		43.	EOC Service Entry	Yes	Yes	N/A	Delivered service data entry for both authorized and non-authorized services. Includes case management notes field. Ability to add multiple services and service categories for one or several consumers.
		44.	Services Management	Yes	Yes	N/A	Ability to enter and update services delivered to consumers
19.	Diagnosis	45.	Diagnosis	Yes	Yes	N/A	Data entry and management of diagnosis axes for both DSMIV and ICD9 code sets
20.	DMH Intra-agency Communication	46.	Messaging	Yes	No	TBD	Automated messaging at specified action points within CIMOR processes
21.	Eligibility Maintenance	47.	Eligibility	Yes	Yes	N/A	Determination of benefits and financial eligibility. Medicaid eligibility data retrieval from Dept. of Social Services files currently retrieved from MEIS. Social Security

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
							Administration retrieval of SSN verification process.
22.	Episode of Care (EOC) / Commitments / Court Orders	48.	Episode of Care Court Order Views Display all episodes of care	Yes	Yes	N/A	Summary of Episode of Care details in printable format Lists all EOCs for Consumer to enable service providers to see history of treatment. Provides printable summary.
23.	Fiscal Intermediary	49.	Fiscal Intermediary (MRDD)	No	Yes	N/A	Administration of family-directed support program to allow families to hire support and report hours worked for payment by fiscal intermediary. Includes electronic interface to the fiscal intermediary vendor.
24.	HIPAA Transaction Translation	50.	BizTalk Payer Transactions (non-HIPAA)	Yes	Yes	N/A	Interface from SAM II for invoice payments
		51.	BizTalk provider Transactions (non-HIPAA)	Yes	Yes	N/A	Accept non-HIPAA consumer demographics pre-encounter data from batch providers
		52.	BizTalk Transactions	No	Yes	N/A	Utilizing Microsoft BizTalk to verify transactions and automate processing
		53.	BizTalk 837 Send Professional Claim	No	Yes	N/A	Send HIPAA 837 Professional claim data to payers (Medicaid, Medicare, Insurance) based on DMH facility and contract provider services/claims
		54.	BizTalk 835 Receive EOB (required fields)	No	Yes	N/A	Receive HIPAA 835 based on professional services/claims processed by payers
		55.	BizTalk 837 Receive Professional Claim	No	Yes	N/A	Receive HIPAA 837 Professional services claims from batch providers
		56.	BizTalk 835 Send Professional Claim	No	Yes	N/A	Send HIPAA 835 transaction to batch providers

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
		57.	BizTalk Send 837 Institutional Claim	No	Yes	N/A	Send HIPAA 837 Institutional claim data to payers (Medicaid, Medicare, Insurance) based on DMH facilities services/claims
		58.	BizTalk Receive 835 Institutional EOB	No	Yes	N/A	Receive HIPAA 835 based on Institutional services/claims processed by payers
25.	HIPAA / EDI Trading Partner Maintenance and Certification	59.	Capturing NPI and applying to claims documents as required by HIPAA	Yes	Yes	N/A	Handling HIPAA NPI identifiers with contract providers
26.	Human Resource Management	60.	Human Resources	Yes	Yes	N/A	Handle adding and removing organization's employee resources to enable reporting of service delivery data
27.	Event Management and Tracking (EMT)	61.	Incident Tracking	No	Yes	N/A	EMT records all incidents, injuries, abuse & neglect, behaviors, and investigations tracking.
28.	Medical Record Maintenance	62.	Physician Orders	Yes	No	Yes	Physician and nursing orders
		63.	Long Term Treatment, Discharge & Aftercare Plans	Yes	No	Yes	Treatment plans, aftercare plans, habilitation plans, discharge plans.
		64.	Summary Views	Yes	No	Yes	Medical record-related information summarized for quick-view or analysis purposes
		65.	Crisis Action Plan View	Yes	No	Yes	Printable summary of specific actions planned
		66.	Discharge Plan	Yes	No	Yes	Printable summary of plan for discharge
		67.	Referral View	Yes	No	Yes	Printable summary of consumer referral
		68.	Treatment Plan View	Yes	No	Yes	Printable summary of consumer treatment plan
29.	Medicare, Medicaid, and Private Insurance	69.	Department of Social Services (DSS) Medicaid Eligibility Interface	Yes	Yes	N/A	Interface with Dept. of Social Services for Medicaid eligibility information from a nightly process

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
30.	MRDD Independent Supported Living (ISL) Budgets	70.	ISL Budgets	Yes	Yes	N/A	Generating budgets and invoices for MRDD's ISL residential consumers
31.	Organization Management	71.	Organization Management	Yes	Yes	N/A	Physical and legal entity description of enrolling providers, other contract providers, and state-owned facilities including any sites described. DMH Facility Units, Unit/Wards, Rooms, Beds. Defining relationship with any entity that provides services to clients.
32.	Outcomes	72.	Delivered Services Data Mart	Yes	Minimal	Yes	Provide access to data warehouse data in appropriate format to handle easy analysis and summary of services provided to consumers
		73.	Outcomes Web Replacement	Yes	Minimal	Yes	Inclusion of screens for collecting outcomes assessment information and ability to print the assessments.
33.	Payer Plans	74.	Payer and Plan Management (Payers)	Yes	Yes	N/A	Administration of divisional payer plans
		75.	Plan Calculation Rules	Yes	Yes	N/A	Establish related business rules
34.	Practitioners	76.	Practitioner Group Management	Yes	Yes	N/A	Practitioner data for DMH staff and contract provider staff. Credentials, licenses, certifications, and degrees included. Interface with SAM II to update DMH staff and related information.
35.	Prioritization in applying Standard Means Test (SMT)	77.	Applying Standard Means Test to invoices based on DMH priorities	Yes	Yes	Yes	Application of standard means test (consumer ability to pay) during payer determination and invoice generation using priorities for programs established by DMH.
36.	Property / Bed Management	78.	Bed Management	Yes	Yes	N/A	Inpatient room and bed management for DMH Facility Units & Wards.
37.	Provider Rate-setting	79.	Usual & Customary Fees Management	Yes	Yes	N/A	Administration of contract service rates and provider contracts

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
38.	Provider / Contract Management	80.	Provider Contract Management	Yes	Yes	N/A	Setting up contracts for services categories and services. Additional provider Demographics.
39.	Registration / Admission / Program Assignment	81.	Enrollment	Yes	Yes	N/A	Registration to a division/facility/site and admission to a service program and level of care. Program eligibility determination and assignment.
		82.	Program Management	Yes	Yes	N/A	Management movement between programs and implementation of program business rules as needed
40.	SAM II Link / SAM II HR Link	83.	SAM II Interfaces	Yes	Yes	N/A	Interfaces with SAM II and the DMH SAM II data warehouse to send invoice information and retrieve payment check and date and DMH staff records.
41.	Standard Means Test (SMT) applied as serviced are delivered	84.	Standard Means Test during Payer Determinations process	Yes	Yes	N/A	Application of standard means test (consumer's ability to pay) during payer determination and invoice generation processes
42.	Substance Abuse Traffic Offenders Program (SATOP)	85.	SATOP Program Support (originally a link within initial SOW)	Yes	Yes	N/A	SATOP data collection screens and tracking of SATOP completions. Printing of SATOP forms.
43.	Supported Community Living, used by both CPS and MRDD	86.	SCL	Yes	Yes	N/A	Generate invoices for consumers services in Supported Community Living program
44.	Third Party Liability (TPL)	87.	Insurance Billing	Yes	No	Yes	Automated generation and processing of insurance claims
45.	Utilization Review	88.	Inpatient Utilization Review	Yes	Yes	N/A	Determination of need for continued stay in inpatient facilities.
46.	Waiting Lists	89.	Waiting Lists	No	Yes	Yes	Management of future services that may be provided to a consumer, for which a consumer is waiting.
		90.	Referrals Management	Yes	No	Yes	Handle external referrals detail information and tracking for consumer records

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
		91.	Authorization XML Viewer	Yes	No	No	Process not used
		92.	Service Delivery Matrix Management	Yes	Yes	N/A	Administration of service categories, service types, and services matrix
		93.	User Access Security Management	Yes	Yes	N/A	HIPAA-compliant security access incorporated into system screens and functions through specified roles
		94.	User Role Management	Yes	Yes	N/A	Ability to add and remove security roles through automated request and approvals
		95.	Pre-Billing Services (Financial Clearinghouse)	Yes	Yes	No	Processing of business rules to support billing decisions
		96.	Pre-billing Services Management	Yes	Yes	No	Ability to make corrections and review services entries prior to billing to payers
		97.	Mental Status Exam	Yes	No	TBD	Implementation of an assessment or screening regarding mental status of consumer.
		98.	Symptoms List	Yes	No	TBD	Look-up of symptoms to aid physician service delivery
		99.	Rapid Intake w/Assessment Screening	Yes	Yes	No	Reference to screen that captures all data required for an emergency intake process with minimal information available
		100.	BizTalk Send 835 Institutional Claim to provider	No	No	No	Send HIPAA 835 transaction data to provider based on claims processed
		101.	Online Help	Yes	Yes	Yes	Easily accessible help information to assist users with various activities within the system
		102.	EOC Forensic Services	Yes	No	Yes	Forensic orders
		103.	Dietary (CBORD)	Optional	Yes	N/A	Dietary functions implementation at DMH facilities with future interface to CIMOR.

IQ # (1)	Business Function in Interview Questionnaire (IQ) (Sept. 2007) (2)	ID # (3)	Identified (ID) Sub-Function (Sept. 2002) (4)	ID in Original Contract SOW (5)	Currently In CIMOR (6)	Planned CIMOR Enhancement (7)	Function Description (8)
		104.	Pharmacy & Pharmacy link (QuadraMed)	Optional	Yes	N/A	Pharmacy functions implemented as provided in contract with vendor. Interface planned for later implementation
		105.	Electronic Medical Records Maintenance	Yes	No	Yes	Electronic medical records of all consumers being served
		106.	Lab	Optional	No	Yes	Lab function including doctor's orders

CIMOR is not complete after seven years (i.e., 2000 – 2007) yet it is performing 87 functions (i.e., 71 original + 16 newly defined) in support of the DMH business areas. What this means is that other functions appeared over time and were determined to have a higher priority than the initially defined set of 88 functions in column (5).

For example during the course of the CIMOR project there have been several major system enhancements or new system developments such as Access To Recovery (ATR) and Organized Health Care Delivery System (OHCDS) that have been necessary and had to be developed by ITSD. This caused CIMOR development to be slowed for extended periods. The ATR function was needed for support of ADA's large Federal grant. There have also been budget cuts that have caused delays. According to ITSD approximately $14M has been spent on CIMOR to date. This represents approximately 1.3% of one year of DMH budget for information technology. The relative cost of CIMOR in comparison with other similar systems will be investigated and discussed in more detail during Phase II.

In 2000 DMH designated employees to participate on an implementation team, which was responsible for overall project management and the development of system requirements. The implementation team assigned employees with expertise in the various operational areas to work groups. These work groups met as necessary to develop requirements for components of the system.[19] Beginning in September 2001, the DMH contracted with an oversight vendor, and established a DMH oversight committee to assist in project oversight by regularly reviewing the project status and progress and offering recommendations to address project issues.[20]

During CIMOR development DMH executive staff changed over time. Naturally an organization's management sets overall priorities and direction for the organization. This influenced CIMOR activities.

The implementation team, Project Oversight Committee, and organizational change all exercised influence and set various priorities regarding CIMOR activities. Now the Business Owner's Group and the IT Steering Committee set CIMOR direction and priorities. All these factors influenced and shaped CIMOR.

2.2 Current Capabilities – Discussion of Capabilities Implemented Thus Far

When compared to the initial contract SOW, 71 or 81% of the initial 88 business functions are currently in CIMOR. Thirteen (13) of the original functions are still planned enhancements. An additional 16 higher priority functions, which preempted work on some of the original 88, have been added to CIMOR.

The very real possibility exists that CIMOR will never be completed if the baseline is the original 88 functions. The point must be made that several factors contributed to this situation. Some of these factors are internal to ITSD while other more significant factors are external to ITSD. These internal environmental factors are discussed later.

This section addresses the currently available 46 business factors presented in column (2) in Table 2. Please note that these 46 functions are the names with which current CIMOR users

[19] State of Missouri Office of the State Auditor, "Mental Health Office of Information," Report No. 2005-36, June 2005, p. 5, http://www.auditor.mo.gov/press/2005-36.pdf.

[20] ibid. p. 6.

are familiar. Please also note that some column (2) functions have more than one sub-component.

The 46 column (2) business functions[21] are comprised of the 71 SOW functions plus the 16 higher priority ones for a total of 88 sub components. In addition the 13 planned enhancements are also addressed.

1. The Access To Recovery (ATR) program supports Access To Recovery grants. These ATR grants are intended to assist recipients in designing and implementing a voucher program to pay for an expanded array of community-based clinical substance abuse treatment and recovery supports.[22] CIMOR performs the administration and implementation of business rules to support the ADA grant including voucher management and services delivery. This ATR business function was not in the initial contract SOW. Additional enhancements are planned for ATR.
2. The Accounts Payable (Adjudication) function has two major components:
   - Account Transactions Search, which provides the ability to search all payment transactions for details of payments.
   - Accounts Payable will perform the following processes on delivered services
     - Appropriate edits
     - Check business rules
     - Find appropriate payer plan
     - Prepare HIPAA-compliant claims for payers and non-HIPAA compliant transactions to SAM II.
3. The Accounts Receivable (Claims Processing) (IQ 3) subsystem performs the following multiple sub-functions:
   - Billing/Claims (Financial Clearinghouse), which either processes claims in HIPAA-required EDI format to Medicaid, Medicare, Insurance companies or processes claims in non-HIPAA format to SAM II (Medicare and insurance claims automation is a planned enhancement).
   - Claims Search capability to scan through claims information to find details of submissions and payments. Providers may also search claims information for details of services submitted and paid.
   - Accounts Receivable (Financial Clearinghouse), which formats State facility delivered services into HIPAA-compliant claims for appropriate payers (Medicaid, Medicare, insurance) and performs claims processing in HIPAA-required EDI format.

[21] Table 2 column (2) was used as the basis for the interview forms. After all interviews were conducted, the discovery was made that IQ #28 “Medical Record Maintenance” is not currently in CIMOR with full formal medical record capabilities. The assumption has been made that respondents referenced the existing CIMOR medical presentation screens and / or other consumer details that are included and related to medical records but do not constitute a complete medical record. An additional function included on the interview form but missing from CIMOR is IQ #20 “DMH Intra-agency Communication.”

[22] Missouri Division of Alcohol and Drug Abuse, http://www.dmh.missouri.gov/ada/ATR/ATRgrant.htm.

- Accounts Receivable, which accepts non-HIPAA claims from SAM II for consumers, guardians, consumer banking and families for services provided.
- Payment Search, which provides the ability to search payments and tie back to, claims/invoices and services billed.
- Payment Receipt with Adjustments, which interfaces with SAM II to retrieve payment check and data.
- Account Transactions Search, which provides the ability to search transactions to determine balance of accounts.
- BizTalk 835 Receive EOB (required fields), which receives HIPAA 835 based on professional services/claims processed by payers.
- BizTalk 837 Receive Professional Claim, which receives HIPAA 837 Professional services claims from batch providers.

4. The Administration (code tables and setups) function performs internal service code Management by managing code tables and edits, including service categories, service types, and diagnosis groups.
5. The Assessments business function performs the following activities:
   - Assessments assign patients to various categories.
   - State Reporting Assessment, which supports assessments data required for state reporting.
   - Clinical Intake Screening, which performs a high-level screening upon enrollment to determine if consumer has service needs across DMH divisions.
6. Authorization / Request / Approval / Review performs the following activities:
   - Treatment Authorization Request may either generate a consumer-specific service authorization request to DMH or generate non-consumer specific administrative and shadow claims.
   - Treatment Authorization Approval provides authorization approval and utilization review processes. It also budgets information for Individual Supported Living (ISL) to create service authorizations and document for Supported Community Living (SCL) providers.
7. Benefit Eligibility performs a determination of benefits and financial eligibility. It performs Medicaid eligibility data retrieval from the Department of Social Services files. It also conducts a Social Security Administration retrieval of SSN verification process.
8. The Case Management subsystem performs the following activities:
   - Consumer Group Management schedules consumer visits or treatment appointments in group settings.
   - Caseload Management provides case managers' with the ability to view regular consumers, enter service logs, and print consumer lists.
9. The Claims Adjudication and Payment subsystem has responsibility for performing the following:

- Service Processing Log provides the capability to see services processed through details of claims and payments made.
- Billing/Claims (Financial Clearinghouse) processes claims in HIPAA-required EDI format to Medicaid, Medicare, Insurance companies and processes claims in non-HIPAA format to SAM II.
- Claim Form with Adjustments provides the capability to adjust claims with void functionality and re-bill capability (this is in process).
- Claims Adjudication provides Explanation of Benefits requirements and display of eligibility information. It also provides the ability to link back to Medicaid services and enter as delivered services for CPR Medicaid Program.
- Payment Search provides the ability to search payments.
- Payment Receipt with Adjustments provides an interface with SAM II to retrieve payment check and data.

10. The Claims Data Entry and Capture subsystem has the following components:
    - Encounter Reporting (Delivered Services), which has the ability to report on all services delivered to a consumer.
    - EOC Service Entry, which allows data entry capability for delivered service for both authorized and non-authorized services. It also Includes case management notes field and the ability to add multiple services and service categories for one or several consumers.
    - Services Management provides the ability to enter and make corrections to services delivered to each consumer.
    - Claim Form with Adjustments, which provides the ability to submit claims for service payment and make adjustments through void and re-bill as needed.
11. The Claims Error Resolution function performs the following activities:
    - Service Processing Log has the capability to see services details and any changes made to services for billing.
    - External Claims Search provides the capability for contract providers to see claims entered and submitted.
12. The Clinical Intake Screening function performs high-level screening upon enrollment to determine if consumer has service needs across DMH divisions.
13. The Complex Allocation Management component conducted maintenance activities of SAM II appropriations and other required data for payment. It allocates DMH funds (through payer plans and service categories) to enrolling DMH and contract providers.
14. The Consumer Banking function manages consumer funds held in trust by state-owned facilities. It also includes deposits (manual and electronic), withdrawals, transfers, calculation of interest, 1099 preparation/submission and check printing.
15. The Management of Consumer Demographics functions has the following two sub-functions:
    - Management data distribution of consumer demographics and check printing.

- Face Sheet Summary, which provides a printable summary of consumer demographics for record.

16. The Contact Management system tracks details of calls or visits to consumers.
17. Co-Pays that are not ATP applies SATOP fees (i.e., $120 assessment and $125 supplemental fee).
18. The Delivered Services (Encounter Data Entry) subsystem performs the following three sub-functions:
    - Encounter Reporting (Delivered Services) provides the ability to report on services delivered to a consumer.
    - EOC Service Entry delivers service data entry for both authorized and non-authorized services. It includes case management notes field and has the ability to add multiple services and service categories for one or several consumers.
    - Services Management provides the ability to enter and update services delivered to consumers.
19. Diagnosis provides data entry and management of diagnosis axes for both DSMIV and ICD9 code sets.
20. DMH Intra-agency Communication is not in CIMOR at the present time but it would provide automated messaging at specified action points within CIMOR processes. It's inclusion in CIMOR is yet to be determined.
21. Eligibility Maintenance conducts determination of benefits and financial eligibility. It also performs Medicaid eligibility data retrieval from Dept. of Social Services files and performs Social Security Administration retrieval of SSN verification process.
22. Episode of Care (EOC) / Commitments / Court Orders provides a summary of Episode of Care details in printable format:
    - Lists all EOC for the consumer to enable service providers to see history of treatment
    - Provides printable summary.
23. Fiscal Intermediary provides administration of family-directed support program to allow families to hire support and report hours worked for payment by fiscal intermediary. It also includes electronic interface to the fiscal intermediary vendor.
24. The HIPAA Transaction Translation subsystem does the following:
    - BizTalk Payer Transactions interface to SAM II for invoice payments.
    - BizTalk Provider Transactions (non-HIPAA) accept non-HIPAA consumer demographics in pre-encounter data from batch providers.
    - BizTalk Transactions utilizes Microsoft BizTalk to verify transactions and automate processing.
    - BizTalk 837 Send Professional Claim sends HIPAA 837 Professional claim data to payers (Medicaid, Medicare, Insurance) based on DMH facility and contract provider services/claims.

- BizTalk 835 Receive EOB (required fields) receives HIPAA 835 based on professional services/claims processed by payers.
- BizTalk 837 Receive Professional Claim receives HIPAA 837 Professional services claims from batch providers.
- BizTalk 835 Send Professional Claim sends HIPAA 835 transactions to batch providers.
- BizTalk Send 837 Institutional Claim send HIPAA 837 Institutional claim data to payers (Medicaid, Medicare, insurance) based on DMH facilities services/claims.
- BizTalk Receive 835 Institutional EOB receives HIPAA 835 based on Institutional services/claims processed by payers.

25. HIPAA / EDI Trading Partner Maintenance and Certification processes handling HIPAA NPI identifiers with contract providers.
26. Human Resource Management handles adding and removing organization's employee resources to enable reporting of service delivery data.
27. Event Management and Tracking (EMT) records all incidents, injuries, abuse & neglect, behaviors, and investigations tracking.
28. The Medical Record Maintenance subsystem is not yet a part of CIMOR and was misapplied to the table. However, it is a planned enhancement.
29. Medicare, Medicaid, and Private Insurance interfaces with the Department of Social Services for Medicaid eligibility information from a nightly process.
30. MRDD Independent Supported Living (ISL) Budgets generates budgets and invoices for MRDD's ISL residential consumers.
31. Organization Management provides physical and legal entity description of enrolling providers, other contract providers, and state-owned facilities including any sites described such as DMH facility units, unit/wards, rooms, beds. It defines the relationship with any entity that provides services to clients.
32. The Outcomes function is comprised of the following two sub-functions:
    - Delivered Services Data Mart provides access to data warehouse data in appropriate format for easy analysis and summary of services provided to consumers.
    - Outcomes Web Replacement provides screens for collecting outcomes assessment information and ability to print the assessments.
33. The Payer Plans functions performs the following two activities:
    - Payer and Plan Management (Payers) administer divisional payer plans.
    - Plan Calculation Rules establishes related business rules.
34. The Practitioners Function supplies practitioner data for DMH staff and contract provider staff such as credentials, licenses, certifications, and degrees. It also interfaces with SAM II to update DMH staff and related information.

35. Prioritization in applying Standard Means Test (SMT) supports the application of standard means test (consumer ability to pay) during payer determination and invoice generation using priorities for programs established by DMH.
36. The Property / Bed Management component supports inpatient room and bed management for DMH Facility Units & Wards.
37. Provider Rate-setting supports the administration of contract service rates and provider contracts.
38. The Provider / Contract Management component creates contracts for services categories and services. It also provides additional provider demographics.
39. The Registration / Admission / Program Assignment component executes the following functions:
    - Enrollment provides registration to a division/facility/site and admission to a service program and level of care. It also conducts program eligibility determination and assignment.
    - Program Management manages movement between programs and implementation of program business rules as needed.
40. SAM II Link / SAM II HR Link interfaces with SAM II and the DMH SAM II data warehouse to send invoice information and retrieve payment check and date and DMH staff records.
41. Standard Means Test (SMT) applied as services are delivered supports application of standard means test (consumer's ability to pay) during payer determination and invoice generation processes.
42. Substance Abuse Traffic Offenders Program (SATOP) data collection screens and tracking of SATOP completions. Supports printing of SATOP forms.
43. Supported Community Living, used by both CPS and MRDD generates invoices for consumer's services in Supported Community Living program.
44. Third Party Liability (TPL) provides automated generation and processing of insurance claims.
45. Utilization Review supports determination of need for continued stay in inpatient facilities.
46. Waiting Lists provides for the management of future services that may be provided to a consumer, for which a consumer is waiting.

The next group of business functions is comprised of those that were not previously classified as part of the preceding 46. Some of these functions may not be viewed or viewable by CIMOR users. That is, they work behind the scenes performing the required activities. The numbering for these is that used in column (3) with the corresponding function shown in column (4).

90. Referrals Management handles external referrals detail information and tracking for consumer records
91. The Authorization XML Viewer process is not used.
92. Service Delivery Matrix Management provides administration of service categories, service types, and services matrix.

93. User Access Security Management provides HIPAA-compliant security access incorporated into system screens and functions through specified roles.
94. User Role Management provides the ability to add and remove security roles through automated request and approvals.
95. Pre-billing Services (Financial Clearinghouse) supports processing of business rules to support billing decisions.
96. Pre-billing Services Management provides the capability to make corrections and review services entries prior to billing to payers.
97. Mental Status Exam is not yet a CIMOR component but would support implementation of an assessment or screening regarding mental status of consumer.
98. Symptoms List is not yet a CIMOR component but would look-up symptoms to aid physician service delivery.
99. Rapid Intake w/Assessment Screening Reference to screen that captures all data required for an emergency intake process with minimal information available
100. BizTalk Send 835 Institutional Claim to provider is neither in CIMOR nor a currently planned enhancement that would send HIPAA 835 transaction data to provider based on claims processed.
101. Online Help is easily accessible help information to assist users with various activities within the system.
102. EOC Forensic Services is a planned enhancement that would support forensic orders.
103. Dietary (CBORD) provides dietary functions at DMH facilities with a planned future interface to CIMOR.
104. Pharmacy & Pharmacy link (QuadraMed) provides pharmacy functions and is implemented as provided in contract with vendor. An interface planned for later implementation.
105. Electronic Medical Records Maintenance to record and track healthcare services for all consumers being served.
106. Lab function to record and track consumer's laboratory tests, including doctor's orders.

2.3 Additional Functions Desired

Some of the next set of business functions to be added to CIMOR has already been identified. Notable among these are the void / re-bill capability, Medical Record Maintenance, and data warehouse enhancements.

The void and re-bill capability that is being planned for rollout this quarter is limited. A more sophisticated version of the void and re-bill process may need to be implemented prior to expanding claim submission functionality to the other divisions.

Both the planned CIMOR enhancements and the responses to interviews clearly indicate that CIMOR continues to require refinement. This section identifies several additional desired functions. Those that are already identified as CIMOR enhancements are simply listed and not discussed. Those that are not already in Table 2 are identified and described.

Currently planned CIMOR enhancements (in no particular order) as identified in Table 2 include the following:

- Access To Recovery (ATR) – already present in CIMOR but enhancements are planned
- Billing/Claims (Financial Clearinghouse) - already present in CIMOR but enhancements are planned for Medicare and insurance claims automation
- Claim Form with Adjustments – the ability to adjust claims with void functionality and re-bill capability is now being added to CIMOR's functionality
- Consumer Banking – already present in CIMOR but enhancements to include 1099s are planned
- Medical Record Maintenance
- Outcomes – already present in CIMOR in minimal form but enhancements are planned
- Prioritization in applying Standard Means Test (SMT) – already present in CIMOR with enhancements planned
- Third Party Liability (TPL) – is not yet present in CIMOR but adding this functionality as an enhancement is planned
- Waiting Lists – already present in CIMOR with enhancements planned
- Referrals Management – is not yet present in CIMOR but adding this functionality as an enhancement is planned
- Online Help – already present in CIMOR with enhancements planned
- EOC Forensic Services – is not yet present in CIMOR but adding this functionality as an enhancement is planned
- Lab – is not yet present in CIMOR but adding this functionality as an enhancement is planned

The following additional functions are suggested for consideration and potentially as CIMOR enhancements. Please note the word "user" below applies to both DMH personnel and providers. The following functions are listed in no particular order:

- Materialized data warehouse that is easy to use from a user's perspective – The current accessible portion of the CIMOR data warehouse is complex, cumbersome and does not perform well.
- Provide historical data in the data warehouse – For DMH to move toward being a "Mental Health Authority" entity it must be able to track and trend numerous data classifications (e.g., treatment, medications, incidents, etc.). The same is true for fiscal issues.
- Provide some standard ad hoc query tool that meets user needs (this would include simple searches) – DMH users must be able to perform their jobs. Likewise providers will need data to perform their jobs better. At present ad hoc queries are at best challenges. Some COTS standard simple query tool with aggregation, statistical, and graphical capabilities should be made available.

- Prepare for data warehouse data mining and advanced analytics – DMH uses the term "data mining" to describe querying, reporting, and trending factual data. As DMH moves toward being the "Mental Health Authority," sophisticated data mining and advanced data analytics will assume a much more significant role.
- Make better use of LogMeIn Rescue – By being able to see the user's computer desktop at the time the problem occurs would greatly facilitate helping the user to resolve the problem.
- Reinforce with users they can use standard copy and paste operations – Reinforce with users the capability to cut and paste is an easy way to access information in multiple open applications at any time in any way just as they would in any Windows session. The objective is to improve user efficiency regarding data manipulation and decrease keying.
- Provide interfaces with CyberAccess, QuadraMed, and C-Bord that allows authorized user access to data and functions – On a patient-by-patient basis healthcare information could be shared between open applications. The capability to upload non-Medicaid information into CyberAccess. Longer term the automatic transferred of data should be available.
- Provide more printable reports directly from CIMOR screens – Users have indicated that this capability would be greatly appreciated.
- Provide some form of "pre-edit" / "pre-business rule" check analogous to an interpreter that allows providers the ability to determine which claims will fail before actual submission – Users are extremely concerned about being able to conform to the business rules if for no other reason than to get paid. If they have some way to determine "business rule rejects" before submission, they will then have more control over what is submitted.
- Provide a mechanism for parallel testing of proposed / modified business rules on both historical and actively submitted claims – providers certainly do not know the impact business rules will have on claims submission (and thus payment) until CIMOR has processed / rejected the claim. The objective here is to run parallel testing on claims to determine what the reject rate will be and what problems can be expected. In this manner providers may be better trained and informed regarding how to submit "correct" claims.

2.4 CIMOR Architecture Capabilities to Support the Future Vision

ITSD in 2001 elected to use Microsoft .NET architecture for developing CIMOR. .NET supports development of applications that are web-enabled.

One of the major implications of this selection is that the use of .NET provides for global access capability. Rather than being restricted to a local area network or even a wide area network, access restrictions for .NET applications are anywhere the Internet is accessible. This means that the technology is available, if desired, to allow a person's web enabled wireless unit to access CIMOR. For example a physician could use a personal digital assistant (PDA) to scan patient files and create physician orders. An Emergency Medical Technician (EMT) at an accident site could be accessing previous medical conditions and treatments via web enabled

devices as well as providing video to physicians and law enforcement. There is virtually no limit to the communications capabilities that .NET supports.

The ASP.NET page and controls framework is a programming framework that runs on a Web server to dynamically produce and render ASP.NET Web pages. ASP.NET Web pages can be requested from any browser (i.e., Windows Internet Explorer) or client device, and ASP.NET renders markup (such as HTML) to the requesting browser. As a rule, one can use the same page for multiple browsers, because ASP.NET renders the appropriate markup for the browser making the request. However, an ASP.NET Web page can be designed to target a specific browser, such as Microsoft Internet Explorer 6, and take advantage of the features of that browser. ASP.NET supports mobile controls for Web-enabled devices such as cellular phones, handheld computers, and PDAs.[23]

The Microsoft .NET Framework offers code access security and role-based security as an integral feature. This helps developers address security concerns to ensure that components have the ability to determine what users are authorized to do.

ADO.NET provides consistent access to data sources such as Microsoft SQL Server and Oracle,[24] [25] which are two of the most popular database management system available. Data-sharing applications can use ADO.NET to connect to these data sources and retrieve, manipulate, and update the data that they contain.[26] Also, .NET supports and is compliant with Open DataBase Connectivity (ODBC). Because ADO.NET separates data access and data manipulation into different components and because ODBC is an industry wide standard, CIMOR has a comparatively unlimited ability to connect to other databases regardless of location (given access rights of course).

Hardware is a commodity that changes rapidly with technology. The driving factor is the ability of the software to perform work to accomplish defined objectives. Thus, while the current CIMOR hardware certainly has the capability for significant expansion, it will sooner or later be eclipsed by new faster technology.

What is likely to occur is a shift to service oriented architecture (SOA). Medicaid Information Technology Architecture (MITA) defines SOA as:

> "A service oriented architecture (SOA) is a software design strategy in which common functionality and capabilities (utility services) are packaged with standard, well-defined "service interfaces" that provide functionality that is formally described and can be invoked using a published "service contract." Users of utility services need not be aware of "what's under the hood;" a utility service can be built using new applications, legacy applications, COTS software, or all three. Utility services will be designed so that they change to support state-specific implementations."[27]

[23] ASP.NET Overview, http://msdn2.microsoft.com/en-us/library/4w3ex9c2.aspx.

[24] Oracle Developer Tools for Visual Studio .NET with Oracle10g Release 2 ODAC 10.2.0.2.21, http://www.oracle.com/technology/software/tech/windows/odpnet/index.html.

[25] .NET Developer Center, http://www.oracle.com/technology/tech/dotnet/index.html.

[26] Overview of ADO.NET, http://msdn2.microsoft.com/en-us/library/h43ks021.aspx.

[27] MITA Information Series, 1 What is MITA? An Overview, http://www.cms.hhs.gov/MedicaidInfoTechArch/Downloads/mitaoverview.pdf.

However, .NET has the capabilities required to implement SOA. Regardless, this is several years in the future.

The bottom line is that the current CIMOR architecture is well placed to support DMH's vision to become Missouri's "Mental Health Authority."

2.5 CIMOR Environmental Factors

This section describes the general developmental and operational environment associated with CIMOR. Some suggestions are presented that address the issues discussed below.

- During the interview process the discovery was made that approximately 10 business rules led to the situation in which many payments were denied to providers. The interviews did not discover what if any activity is being conducted to determine what precisely caused payment slow down. Thus, expectation is that as soon as those 10 rules are re-activated the same payment problem will reoccur. ITSD and DMH ADA should work with providers to determine what specifically caused the claims rejections to occur and thus payment stoppage. The suggestion is also made that parallel testing with live data be conducted to determine the effect of reintroducing the 10 business rules before they are reinstated on the providers.
- The early decision to use a web-based deployment and Microsoft software (i.e., .NET) demonstrated great foresight. That decision has positioned CIMOR well for maintainability and expandability on a current technology platform.
- Given the resources, budget limitations and major competing IT initiatives (HIPAA, ATR, OHCDS) during the course of developing and implementing CIMOR, ITSD has done a commendable job of implementing a complex enterprise-wide system replacing several legacy systems using new technology.
- In 2000 the Office of Information Technology published on its web site project management policies, guidelines and best practices.[28] ITSD has stated that CIMOR project management is based on the Missouri Project Management Best Practices Reference Manual 4.0.[29] However adherence to these practices for various reasons was less formal and less structured than perhaps needed for a project of this magnitude. The project planning employed has not provided a comprehensive and continually updated big picture with a formal critical path method schedule (described in 4.0 but may not have been described prior to 4.0[30] and work breakdown structure (described in the 4.0 but may have not been described prior to 4.0[31]). However ITSD does state that it is working to improve its adherence to the project management principles described in the State manual.

[28] [28] 2000 Missouri State of the State Information Technology Report, p. 9, http://oa.mo.gov/itsd/cio/archive/2000StateoftheStateITReport.pdf.

[29] Missouri Project Management Best Practices Reference Manual 4.0, http://oa.mo.gov/itsd/cio/projectmgmt/PDF/manual2006.pdf.

[30] Missouri Project Management Best Practices Reference Manual 4.0, Chapter 3 – Page 13, http://oa.mo.gov/itsd/cio/projectmgmt/PDF/manual2006.pdf

[31] ibid., Chapter 1 – Page 22, http://oa.mo.gov/itsd/cio/projectmgmt/PDF/manual2006.pdf.

- With particular emphasis on software project management, ITSD would benefit from adopting a formal software estimating process that generates objective, quantifiable (i.e., numerical) task estimates. Further ITSD could use some form of scheduling software such as MS Project for managing projects as had been done prior to the implementation problem occuring. Both the software estimating process and scheduling software could be considered for efforts in excess of 30 calendar days but mandatory for those over 90 calendar days. Please note that while Missouri Project Management Best Practices Reference Manual 4.0 does recommend task duration be computed,[32] it does not state how to do so with any specificity. ITSD could consider exploring cost estimation models such as COCOMO II (http://sunset.usc.edu/research/COCOMOII/), which is free, or Construx at http://www.construx.com/.[33]
- ITSD has a significant opportunity to improve their capability to monitor system performance. This performance ranges from the network load to the database and processor load. Just as DMH is emphasizing that mental and behavioral healthcare be based on objective, quantifiable, and measurable outcomes, ITSD should consider adopting objective, quantifiable and measurable outcomes for CIMOR and its supporting architecture. There is definitely a need for stress testing and volume testing to be conducted on transaction oriented systems particularly those with over 6,000 users.
- Based on the interviews conducted, a significant communications gap appears to exist between ITSD and its users. In particular there seems to be a considerable disparity between the ITSD staff perspective and the end DMH system user perspective of what is needed regarding using CIMOR to meet DMH user business needs. As a specific example, the CIMOR data warehouse planned enhancements are going in the right direction but are not nearly comprehensive enough to address the end user needs for ease of use and understandability. The suggestion is made for ITSD to consider being proactive and conducting weekly visits to various individual users, both DMH and providers, to discover what their needs and concerns are, and then attempt to see if solutions / workarounds can be found quickly.
- ITSD appears to have highly professional and competent personnel. ITSD has relied on their excellent staffs' experience to conduct problem analysis. Based on interviews this ad hoc form of problem analysis for a major comprehensive system is not always adequate. ITSD should consider adopting a formal problem analysis process to apply to CIMOR. Several unresolved problems (e.g., timeouts) still remain with CIMOR. More effective ways than trial and error are available to resolve critical system complexities. For example, Kepner-Tregoe at http://www.kepner-tregoe.com/ and Apollo at http://www.apollorca.com/ provide root cause analysis packages.[34] ITSD has just recently ordered Symantec i³, which may be used to capture factual data for use with such root cause analysis packages as Kepner Tregoe.

[32] ibid., Chapter 3 – Page 23, http://oa.mo.gov/itsd/cio/projectmgmt/PDF/manual2006.pdf.

[33] This is neither an endorsement nor recommendation to move to either of these packages. Likewise it is neither an endorsement nor recommendation to use either of these products.

[34] This is neither an endorsement nor recommendation to move to either of these packages. Likewise it is neither an endorsement nor recommendation to use either of these products.

- From a quality perspective ITSD needs to have some mechanism to monitor its and CIMOR's performance. Metrics regarding such issues as timeouts, number of types of bugs, bug locality of reference, network traffic, claims rejected / reason, tasks completed on time, tasks completed late, etc. are useful. ITSD is unaware of how well (or poorly) they are performing in some areas. Quality measures need to be investigated and those appropriate adopted.
- FOX would recommend that a formal software development methodology be investigated and adopted and could substantially reduce the amount of time to deliver a product. Seven years to deliver a system that is not yet finished causes problems. IEEE and CMMI have software development methodologies that use a waterfall approach. ITSD has begun preliminary investigation and consideration of agile software development approaches to reduce development times. ITSD has based CIMOR's project management around the Missouri Project Management Best Practices Reference Manual 4.0. ITSD may not have the flexibility to select some other methodology such as an agile approach. ITSD may want to consider creating some form of quick response group within ITSD. The quick response group could be comprised of 1 – 3 individuals that would actively work to resolve user problems that can be completed in at most five business days and average around 1.5 business days. The objective is to develop 81% solutions using 20% of the effort required for a 100% solution. This quick response group would be outside the normal bug fixing and development group activities. Obviously if the quick response group did not have any activities they could work on bug fixes or other activities.

3 Interviews with CIMOR Key Stakeholders

FOX consultants conducted a series of interviews with key DMH stakeholders to gather various perspectives on the system and develop a comprehensive picture of the strengths, weaknesses, and overall perceptions of the status of the current CIMOR system from all stakeholders.

3.1 Interview Process and Tools

Interviews were conducted with DMH executive management, business owners, and Information Technology Services Division (ITSD) technical staff responsible for development and maintenance of the system, as well as with six contracted providers and the Community Mental Health Clinic Coalition of providers. Interviewees were selected by ITSD from the Department of Mental Health staff involved in CIMOR development and implementation. Providers were selected by the various program business owners from all three DMH divisions, Alcohol and Substance Abuse (ADA) Division, Comprehensive Psychiatric Services (CPS) Division, and Mental Retardation and Developmentally Disabled (MRDD) Division, and were comprised of a variety of small and large providers located throughout the State of Missouri.

Targeted electronic interview questionnaires were developed for each of the different groups (see Appendix A) and emailed to each interviewee prior to the scheduled interview. Meetings were then arranged, either in person or via teleconference, to go through the questionnaires, record the responses, and gather any additional information as necessary.

The DMH interview groups included:

- DMH Executive Management: 10 individual interviews
- DMH Business Owners: 7 individual interviews
- ITSD technical staff: 4 group interviews, as follows:
  - ITSD Management – Project Manager and Department Director;
  - IT Data warehouse and reporting team;
  - IT technical/network team; and
  - The CIMOR development team.

Interviews were also conducted with six outpatient provider entities that use CIMOR to obtain their perspectives on the system. Five of these providers were selected the DMH business owners and one provider contacted FOX consultants directly asking to be interviewed. One provider organization, the Missouri Coalition of Community Mental Health Centers, was also interviewed. The Coalition had collected surveys from 23 of its members, 18 to 20 of the largest CPS providers, the majority of whom also provide ADA services, and averaged the responses for their interview. So these responses actually represented a larger number of providers' responses than the number of interviews conducted. The providers interviewed were the following:

- Family Counseling Center of Missouri, Inc. (ADA programs)
- Pathways Behavioral Healthcare (CPS programs)
- Gibson Recovery Center (ADA programs)

- Preferred Family Healthcare, Inc. (ADA & CPS programs)
- Jefferson County Developmentally Disabled Resource Board (MRDD programs)
- Queen of Peace Center (ADA programs)

3.2 Interview Summaries and Identified Perceptions

The overwhelming response from DMH interviewees and five of the six providers is that CIMOR should be enhanced rather than replaced with another system. Rationales given included:

- No commercially available application contains all the functionality currently in and/or planned for CIMOR;
- Having an in-house system provides flexibility to meet changing program and departmental needs;
- Interviewees would rather build on past experience and efforts;
- Recent system changes appear to be fixing past problems and improving CIMOR performance; and
- Providers wish to avoid administrative burden and additional disruptions in programs and services that would occur if users have to learn another new system.

There was recognition that commercially available software may be able to assist with enabling certain functionalities, but that it was necessary to custom build the overall system to meet DMH stakeholder needs. The development process was an essential learning experience that provides DMH a strong foundation for future development and enhancement of CIMOR. However, a number of interviewees did mention that CIMOR has suffered from too many expectations and too little funds and resources, which may remain an ongoing issue.

Overall, CIMOR has the highest ratings among the DMH business owners and ITSD management, and seems to best meet the business needs of the DMH business owners. This indicates that the needs of the key stakeholders groups interviewed may not have equal weight in the CIMOR development and implementation process. The perception is the provider and consumer needs in particular seem to often be dismissed as unimportant.

Each set of stakeholders has differing key needs, which impact their perceptions of CIMOR and the information obtained through the system:

- DMH executive management needs complete and accurate information for decision making regarding services provided by DMH programs and for communicating how money is spent, whether those expenditures are cost effective, and whether those expenditures make a difference to state and federal government, legislators, stakeholders and the public.
- DMH business owners need information and systems that support program operations and provide information required by federal government to obtain grant funds and meet grant reporting requirements; contract for appropriate services, track allocations and make payments/expend funds to providers for health services provided.
- Contracted providers are most concerned with serving the maximum number of clients possible within the funds available, recording accurate clinical documentation, and get reimbursed in a timely manner for services rendered.

- The IT department needs adequate input as to business needs and processes that the system is expected to support, as well as sufficient resources to meet those needs.

Each set of stakeholders has differing percepts as a result of differences in what is important to their business needs.

- DMH executive management interviewees generally believe the data and reporting capabilities are inadequate or insufficiently accessible for decision making. Many expressed concerns as to whether CIMOR could meet all stakeholder expectations.
- DMH business owners are generally quite positive about CIMOR's capabilities and potential, and of all the stakeholders interviewed, conveyed that the system meets most of their business needs. Business owners seem to be most satisfied with the financial and provider contract functions, and that CIMOR has improved day-to-day operations within the divisions. The business owners also perceived that CIMOR's capability to enforce ADA business rules has greatly improved data quality for program purposes.
- Contracted providers are generally more negative about CIMOR's capabilities, and from the interview responses the system appears to meet providers' needs the least of all user groups. As CIMOR is intended for use in the process of service provision, implementing CIMOR required a major paradigm shift and operational changes at the provider level. This shift resulted in a huge learning curve for many users and required usage by professional staff that had never used the old legacy systems. The extended learning curve coupled with mandatory use of CIMOR, particularly for treatment activities, has caused serious business disruptions and impacted provider revenue flow. Contracted providers seem to be least satisfied with the prior authorization and utilization review functions, and most feel that CIMOR has significantly hindered their operations and the provision of care. Contracted ADA providers perceive CIMOR's enforcement of ADA business rules as negatively impacting data quality for clinical and service provision purposes. Clinical data for assessments not entered in the CIMOR prescribed sequence may require re-keying the entire assessment to correct errors. Providers see this as an undue administrative burden on their end to get their billings through the system. A good analogy would be "like throwing the baby out with the bath water."
- IT Management believes the DMH ITSD staff has done a very good job in developing and implementing the CIMOR system, and is confident that the system meets many user needs. IT Management sees very few downsides to the system, but IT Management is not CIMOR end users and therefore has a narrower perspective that is not particularly relevant to user needs and concerns.
- It is evident that DMH IT staff have done a commendable job of implementing a strong core system with various complex functionalities, but their focus on these successes (and probably also the amount of criticism received when the system was implemented) has let them to be dismissive of user, and in particular provider, issues with CIMOR. While it is true that some complaints from some providers are probably over emphasized, CIMOR has created some real issues at the point of care and for provider revenues.

  IT Management is probably not the appropriate group to take the lead in addressing these issues, but if DMH wants provider attitudes towards CIMOR to improve, then it is

suggested that DMH divisions must include providers in the process and actively work to understand and address their concerns.

Comparisons of the statements about CIMOR usability, implementation and satisfaction rated highest by each interview group are shown in Table 3 below.

Table 3 Highest Ranking Statements of CIMOR Attributes

Statement	Business Owners	Providers	IT Management
CIMOR meets user needs.			X
CIMOR data responses are correct.	X		X
CIMOR is available when users need it.	X		X
CIMOR response time meets user needs.			X
Users find CIMOR easy to use.			X
Users find it easy to obtain the status of a claim.	NA	X	NA
CIMOR contains claim edits.	NA	X*	NA
The CIMOR Help Desk provides the assistance users need.	X		X
The CIMOR Help Desk provides timely responses.			X
The CIMOR Help Desk's responses are relevant to user needs.	X		X
The CIMOR Help Desk is knowledgeable about user needs.	X		X
The CIMOR Help Desk treats users with respect.	X	X	X
The CIMOR Help Desk is friendly to users.	X	X	X
The process used to inform users of CIMOR system changes currently meets users' business needs.			X
The current level of CIMOR testing prior to implementing system changes meets users' business needs.			X
CIMOR helps users perform their job functions.			X
CIMOR helps users improve healthcare delivery.	X		
CIMOR hinders healthcare delivery.		X*	

*Although ranked highly, these rankings are not necessarily positive. Providers often mentioned there were too many claim edits, and these were causing higher claims rejection rates. Providers strongly agreed that CIMOR hindered healthcare delivery, which is a negative statement.

Because the DMH business owners and IT management were asked to evaluate and rank some of their own program activities related to CIMOR, their responses are likely to have a positive bias. For example, all the attributes of the Help Desk capabilities and responses were rated above average by all but one business owner and IT management respondents. However, some of the Help Desk statements also received high rankings from the providers, who actually

used the Help Desk resources the most. This is the only area of agreement on the highest ranking attributes between providers, business owners, and IT management.

Comparisons of the statements about CIMOR usability, implementation and satisfaction rated lowest by each interview group are shown in Table 4 below.

Table 4 Lowest Ranking Statements of CIMOR Attributes

Statement	Business Owners	Providers	IT Management
The level of CIMOR testing prior to initial implementation met users' business needs.	X	X	X
CIMOR helps users perform their job functions.		X	
CIMOR helps users improve healthcare delivery.		X	
CIMOR hinders healthcare delivery.			X*

*Although ranked low, this ranking is not necessarily negative. This particular statement shows that IT Management somewhat disagreed that CIMOR hinders healthcare delivery.

Because the DMH business owners and IT management were asked to evaluate and rank some of their own program activities related to CIMOR, their responses are likely to have a positive bias. For example, IT Management only marked two attributes below the average; business owners only marked one. The only area of agreement on the lowest ranking attributes between providers, business owners, and IT management was in disagreeing with the statement "The level of CIMOR testing prior to initial implementation met users' business needs."

3.2.1 Executives

DMH Executive Management interviewees were not specifically asked what they thought about CIMOR or about the system's strengths and weaknesses. However, while the interviews show that Executive Management is aware of the issues around CIMOR, most were generally positive about its potential. But all also perceived deficiencies in the system as related to their specific departmental business needs.

A major business need for DMH Executive Management is the ability to use the information in CIMOR for management decision making. The primary information needs for DMH Executive Management are for aggregated data for varied types of analysis and reporting to higher levels of state and federal government, to the legislature, to other department stakeholders and the public. Examples of those analysis and reporting needs include budget purposes, managerial performance, department, state and federal service targets, monitoring expenditures and program operations, reporting to obtain and meet the requirements of federal grant funding, monitor and conduct oversight activities, benchmarks and performance measures, assure accountability and service provision, evaluate program and service effectiveness and outcomes, and monitor and improve quality.

DMH Executive Managers are not typically direct users of CIMOR, and therefore their perceptions are more likely based on hearsay, but they are users of the kinds of information collected by CIMOR and similar systems and know whether or not the data they need is accessible through CIMOR. DMH Executive Management does not believe that CIMOR is

currently able to meet most of these particular analysis and reporting needs. Much of this belief is not so much related to the capabilities of CIMOR to collect and store data as it is with the CIMOR data warehouse structure and with the quantity and quality of the data available in the warehouse.

CIMOR currently loads data directly from the system into a CIMOR data warehouse and makes it quickly accessible to users through a large number of tables. The most common tool used for reporting is MS Access. This does make a large amount of data available to users, but not in a structure and format that is easily understood or easily turned into meaningful information. The availability of the data warehouse appears to have generated expectations that most analysis and reporting activity will shift to users, but understanding and using the data warehouse and the massive amount of data in it is too complex for most unsophisticated users.

Some of the issues that make the data unsuitable for management analysis and reporting purposes are:

- The information in the data warehouse is a daily raw data dump from the CIMOR system and contains an overwhelming amount of data, which makes it very difficult to understand and manage, particularly for unsophisticated users. However, some data elements necessary for analysis and reporting are not captured by or available in CIMOR.
- The raw data contains missing data and unstable data (data that are subject to change at any time), compromising data integrity for analysis and reporting. This variability gives rise to concerns about data quality and accuracy. Data stability and consistency is mandatory for research, analysis and reporting purposes.
- There does not appear to be a way to count duplicate incidents of clients, services, diagnoses, etc. as required for various analysis and reporting purposes. There must also be a way to chronologically sequence the data.
- A DCN standard identifier is not available for non-Medicaid consumers to link consumers and their information longitudinally and across Departments.
- More standard reports and queries are necessary to assist users with the data warehouse if all analysis is being shifted to the programs, easily customizable queries would greatly facilitate ad hoc analysis and reporting.
- Although a data dictionary is available, it does not address the more important need to synchronize definitions for the same or similar terms across programs.
- CIMOR contains only DMH Consumer data at this point, and users need information sources beyond DMH for reporting and analysis. Data from several different systems (e.g., Medicaid) is only available through the legacy data warehouse and may need to be added to CIMOR data warehouse to conduct analysis and create reports.
- If many users are having difficulty in accessing, understanding, using, analyzing, or interpreting the data, then the data would be essentially unavailable to users.

Other perceptions of DMH Executive management are listed below. Note that not all of these perceptions are directly related to the CIMOR application itself, but often reflect programmatic issues, primarily related to lack of coordination or standardization of data definitions across programs.

- It is difficult to get priority for necessary changes/additions to the system, or information about when planned changes might be implemented.
- There are risks to consumers if accurate data or complete data are not available.
- Lack of a single DMH standard for various program processes (standard means test, eligibility, age of an adult, etc.) is an issue.
- There are substantial concerns that the system cannot support a large number of additional users and hold up under peak load periods, such as right before billing cut off dates.
- System integration alone is not sufficient; operational and process/procedural change and integration is also necessary for program and system effectiveness.

3.2.2 Business Owners

DMH business owners are overall the most positive CIMOR users and appear to recognize its potential to support business needs. Business owners rarely rated any of CIMOR's business functions at the lowest level, and more often than providers rated more of the business functions at the highest levels.

Major business needs for DMH business owners is to monitor and operate their programs. Because business owner responses are generally positive, it appears that CIMOR is largely meeting their business needs. DMH business owners are more likely to be direct users of CIMOR, or to work directly with program staff that do, and have a more operational understanding of the system. DMH business owners perceptions of the various functions of CIMOR varied widely, however, by program and business area of the interviewees. The ADA program has had the most input into CIMOR development to this point, and that program and its providers utilize the broadest range of system functionalities. The functions that seem to be working best from the business owner perspective are the financial functions and the program/ business rules.

Other perceptions from business owner interviews include the following:

- Not all necessary data elements, including those for SAM II processing, are in CIMOR.
- Legacy systems are still needed for many functions and information needs.
- Varying comfort levels with system and use of electronics vs. paper greatly impacts usage of CIMOR.
- Data elements in the data warehouse need to be synchronized for names and definitions.
- Data quality assessment functionality is needed.

3.2.3 Information Technology

DMH IT Management was interviewed for their perceptions of the process, but is not a business user of the system. DMH IT Management is overwhelmingly positive about the work that the IT staff has done to develop and implement CIMOR to this point. DMH IT Management generally sees the fewest deficiencies in the system, or is more likely to see these as areas under development.

Major concerns for DMH IT Management as related to CIMOR is having a good understanding of user needs and having sufficient resources to address those needs in the system. DMH IT Management staff are not typically direct users of CIMOR or of the information captured in CIMOR, and IT Management business needs would not typically be addressed by CIMOR functions or information.

Other perceptions from IT Management are:

- Project Management since implementation has been somewhat lax because the development team was in a reactive mode, but may be strengthening now that many of the initial CIMOR issues have and are being addressed.
- It is difficult to estimate the amount of time for various tasks because of new technologies and little to no previous experience with many of the development activities.
- Testing is done in a three day window by DMH staff users, who use their own judgment as to what and how to test. System changes are made accessible to testers, but there does not seem to be any process to see if the users were able to test and what they tested.
- The users are unable to do adequate stress testing at this time due to insufficient amounts of data.

3.2.4 Providers

DMH Contracted providers' perceptions about CIMOR range from moderately positive to extremely negative. Most of the interviewees are at least somewhat frustrated with some aspects of CIMOR at present. They perceive the system as adding to their workload, requiring additional staff time, and requiring duplication of entry and effort with their internal systems. Most are not seeing a huge amount of benefit to their operations as yet, although most agree that using a single system is preferable to the multiple DMH systems required in the past. Some providers generally perceived that they were not included in CIMOR development and testing processes, and some indicated they are not receiving notifications on changes, updates, and disruptions to the system, or when new functionality is operational. Bottom line concerns for providers are providing services and getting paid: all interviewees expressed concerns that both of these processes have been at least somewhat disrupted by having to use CIMOR.

Providers rarely rated any of CIMOR's business functions at the highest level, and more often than any other group rated more of the business functions at the lowest levels. Five providers indicated a preference to enhance CIMOR; one provider would prefer to replace it.

The consensus from the 23 members of the MO Coalition was to enhance CIMOR. Providers do not want to lose their investment of time and effort already put into CIMOR; most can see the potential benefits of the system and conveyed a perception that CIMOR can be fixed/enhanced and made workable. Most providers perceived the system foundation as sound, the screens are fairly easy to navigate, where the system works it works reasonably well, problems are being resolved and functionality is improving.

Major business needs for providers are to provide services and get paid. Because provider responses are generally on the negative side, it appears that CIMOR is generally not meeting their business needs. Providers are direct users of CIMOR, and have a solid operational understanding of the system from the provider perspective and how it relates or duplicates

functionality within their own systems. Providers' perceptions of the various functions in CIMOR were varied by program and business function of the interviewees. The functions that seem to be working best from the provider perspective are Assessments, Benefit Eligibility, Eligibility Maintenance, and Organization Management.

Provider usage of CIMOR is currently variable across the three main programs. Only ADA uses all CIMOR functions; CPS facility providers use CIMOR for enrollment and census; MRDD non-residential providers do not use CIMOR at this time.

Other perceptions from provider interviews are listed below. Note that not all of these perceptions are directly related to the CIMOR application, but often reflect programmatic decisions and communication issues.

- CIMOR has the potential to become an effective record management system. Providers generally like the idea of having information from all providers available in one system.
- Perceived issues with the implementation process include a lack of clear project goals and timeliness for adding functionality; general lack of communication, and a general consensus that certain functionalities do not work well.
- Reporting capabilities are minimal; providers put data into CIMOR but are unable to get reports/information from CIMOR.
- There were issues in conversion of data from old systems to CIMOR; there continues to be a problem pulling prior historical data.
- The providers have a large backlog of claims from last fiscal year due to lack of void and re-bill process in CIMOR. There is a short window of time in which to re-submit, and DMH must make sure the system has the capacity to handle the load near to billing deadline.
- Enforcing the business rules resulted in major issues during the implementation of CIMOR. DMH cannot assume chronological billing or services in addiction treatment, and the business rules make it cumbersome to enter services.
- There were some staff training issues. Training was provided too early; the system as implemented was different than the system providers trained on.
- Testing of CIMOR prior to implementation was inadequate and providers were not included in testing.
- CIMOR creates a burden on clinicians to gather data needed for assessments and interrupts the care process.
- The ADA utilization review and authorization processes are cumbersome.
- Providers continue to use their own systems, resulting in duplicate data entry for CIMOR and their internal systems. Other systems are still necessary for operational and informational purposes.
- The CIMOR IT Help Desk received the highest ratings of any of the system attributes. The IT and Business Unit Help Desk staffs treat providers with respect and are patient with and friendly to users.
- Batch billings are a problem when changes are made to claims during processing.

Some CIMOR implementation processes, attributes and perceptions did receive the highest rankings, and providers universally strongly agreed that the Help Desk staff were friendly and respectful. This did not always translate into helpfulness in responding to problems, although in general this was rated more positively than negatively. Another attribute rated positively was the ability to find the status of a claim. One other attribute that providers strongly agreed with was that CIMOR includes claim edits; however, this should not necessarily be interpreted positively as the high ranking often reflected that providers felt that CIMOR included too many edits, with little or not opportunity to correct errors, causing a high volume of billing rejections.

Because the number of providers interviewed was so small and included providers with very different uses of and experiences with CIMOR, the responses should not be considered representative of the provider community at large. The system, business rules, etc. have to date been implemented with focus on both DMH facility processes and the ADA community. The ADA providers are using all or most of the system functionalities at this point. This also means that the current system probably meets their needs more than those of the other provider types. The ADA providers received more intensive training, so the experiences of the CIMOR provider community are not all equal. Each division (ADA, CPS, and MRDD) has their own help desk, so a provider's experiences with the help desk for one division may be different than that for another division.

3.3 DMH Vision of Future Business Needs

DMH Executive Management was asked to state what they saw as the department's business and technology needs in the future. Future system/technology needs are largely oriented towards automating certain processes, integrating more services and information, and the need for more and more integrated information to provide services and to monitor and meet federal, state and program requirements. Quality and effectiveness are becoming more important over time, and require more data and analysis to support.

Some Executive Management indicated a long-term goal of moving the agency toward being Missouri's "Mental Health Authority" instead of being a direct services provider and payer. In general the types of systems functions needed to support this vision would be analytical reporting, business intelligence, and data warehouse capabilities with greatly reduced need for operational functions (e.g., gathering clinical assessments or claims processing.

DMH Executive Management listed the following most often as perceived future needs:

- Integration of medical and behavioral healthcare data to facilitate service coordination
- Conversion to a public health model for mental health delivery, with more focus on prevention and early intervention
- The capability to store and track dual diagnoses
- Access to a broader range of data and data sources
- Measures for data driven decision making, including information on outcomes, pay for performance, performance measures, scorecards, quality of care, patient safety, and other key indicators
- Electronic health records (some refer to CyberAccess as a model) and personal health records (accessible to consumers)
- Increasing electronic information exchange across programs and agencies

- Computerized physician order entry (CPOE)
- Bar coding for medication and electronic pharmacy dispensing
- Integration of information on child health programs (i.e., Children's data warehouse)
- Shifting away from service provision to an oversight entity
- Evidence based/best practices and decision models for choosing the best treatment
- Capability for improved continuity of care
- Document management
- New data needs as consumer's age (recently identified conditions such as autism, monitoring usage of new drugs, etc.)

Other needs identified in the other stakeholder interviews:

- Data and information portability through use of mobile devices (PDAs, laptops, handhelds)
- Business rules will continue to evolve and change

3.4 Perceptions on CIMOR Business Processes Ability to Meet DMH Needs

Section 2.2 presented the CIMOR business functions and described briefly what each does. An obvious question is "How well does CIMOR perform its functions?" The answer to this question, like Figure 2, depends on which side of the fence one stands. That is, perception is reality.

A series of interviews were conducted with ITSD management, DMH business owners, and providers. One of the series of questions asked was identical for all three groups. These questions and the responses are shown in Figure 3. Each respondent was asked to indicate their level of agreement with each statement using the 1 – 5 scale shown in Table 1.

For example given the statement "CIMOR meets user needs," if the respondent agreed with that statement, he / she would answer "4." If he / she disagreed with the statement, then the answer would be "2."

No comparable questions about CIMOR functionality were asked of the DMH Executive Management interviewees. However, interview responses indicate that DMH Executive Management needs aggregate data and reporting capabilities, which are not yet being met by CIMOR, although work on these is underway.

General Statements About CIMOR - ITSD Vs Business Owners Vs Providers Perceptions

Question #	Statement	ITSD	Business Owners	Providers
1	CIMOR meets user needs.	4	3	2
2	CIMOR data responses are correct.	5	4	3
3	CIMOR is available when users need it.	4	4	3
4	CIMOR response time meets user needs.	4	3	3
5	Users find CIMOR easy to use.	4	3	2
6	The CIMOR Help Desk provides the assistance users need.	5	4	3
7	The CIMOR Help Desk provides timely responses.	4	4	3
8	The CIMOR Help Desk's responses are relevant to user needs.	5	4	3
9	The CIMOR Help Desk is knowledgeable about user needs.	4	4	2
10	The CIMOR Help Desk treats users with respect.	5	4	5
11	The CIMOR Help Desk is friendly to users.	5	4	5
12	The process used to inform users of CIMOR system changes currently meets users' business needs.	4	3	3
13	The level of CIMOR testing prior to initial implementation met users' business needs.	2	2	1
14	The current level of CIMOR testing prior to implementing system changes meets users' business needs.	4	3	2
15	CIMOR helps users perform their job functions.	4	4	2
16	CIMOR helps users improve healthcare delivery.	3	3	2
17	CIMOR hinders healthcare delivery.	1	2	4
18	Overall users are satisfied with CIMOR.	3	3	2

Figure 3 ITSD, DMH Business Owners, and Provider Perceptions about CIMOR

Figure 3 shows the responses for each of the three stakeholders: ITSD, business owners, and providers. Figure 4 graphs the values.

Figure 5 compares only the business owners and the providers. Both the table in Figure 3 and the chart in Figure 5 show that all DMH business owners ratings are at three (3) or above with the exception of statement #13, which has to do with CIMOR implementation testing. (Please note that question 17 is a negative. The question is “CIMOR hinders healthcare delivery.” To make it consistent with the other ratings, use 6 – XX. For example, the adjusted value for business owners would be 4 = 6 - 2.) Figure 3 and Figure 5 also show that ten (10) or 56% all responses are four (4) or above.

While DMH business owners may not be totally pleased with CIMOR, they are definitely not negative regarding these statements.

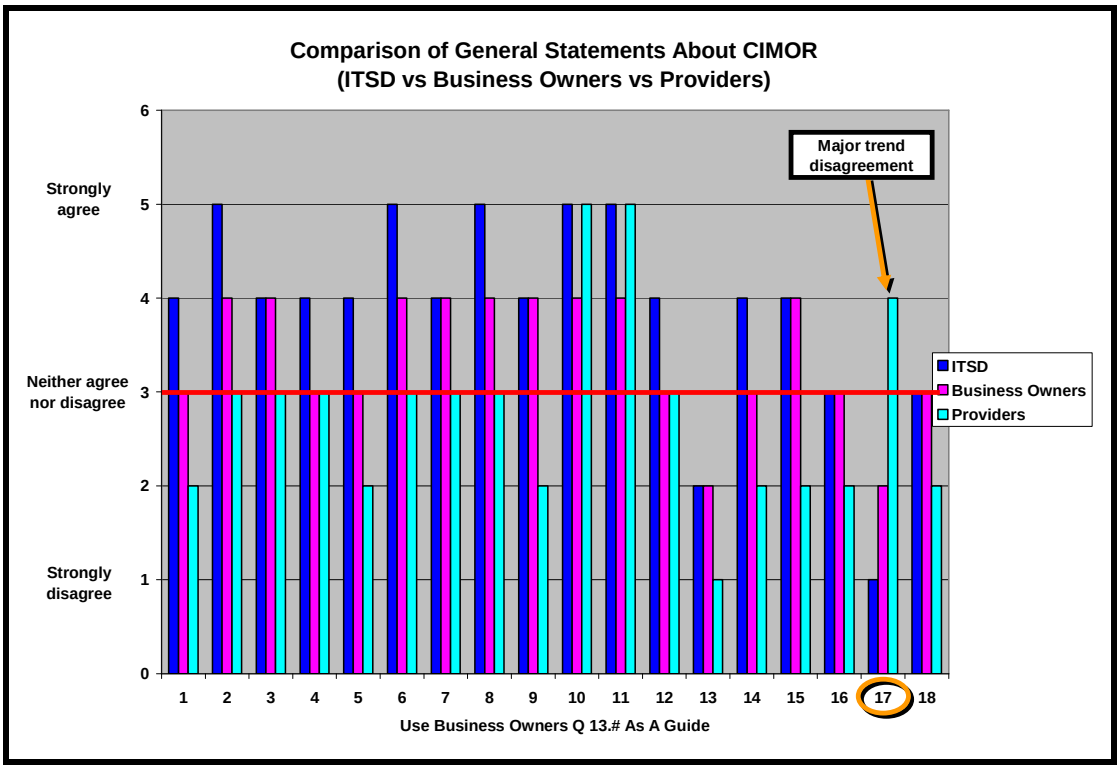


Figure 4 ITSD, DMH Business Owners, and Providers Perceptions

Providers, on the other hand, are definitely not pleased. The same two figures (i.e., Figure 3 and Figure 5) show that nine (9) statements or 50% received a response of 3 or greater, and only two (2) statements received a four (4) or above. (Please note that question 17 is a negative. The question is "CIMOR hinders healthcare delivery." To make it consistent with the other ratings, use 6 – XX. For example, the adjusted value for providers would be 2 = 6 - 4.)

Figure 5 shows nine (9) statements or 50% received a two (2) or lower, one (1) statement received a one (1) from providers. System implementation testing is the statement that received a one (1).

Statement 17 is "CIMOR hinders healthcare delivery." With a rating of four (4) in Figure 3, providers definitely view CIMOR as a problem in completing their mission: healthcare delivery. Business owners on the other hand do not view CIMOR as a hindrance with a rating of two (2).

Interestingly the business owners did not assign a single five (5) to CIMOR while providers gave CIMOR two fives (5) regarding the Help Desk.

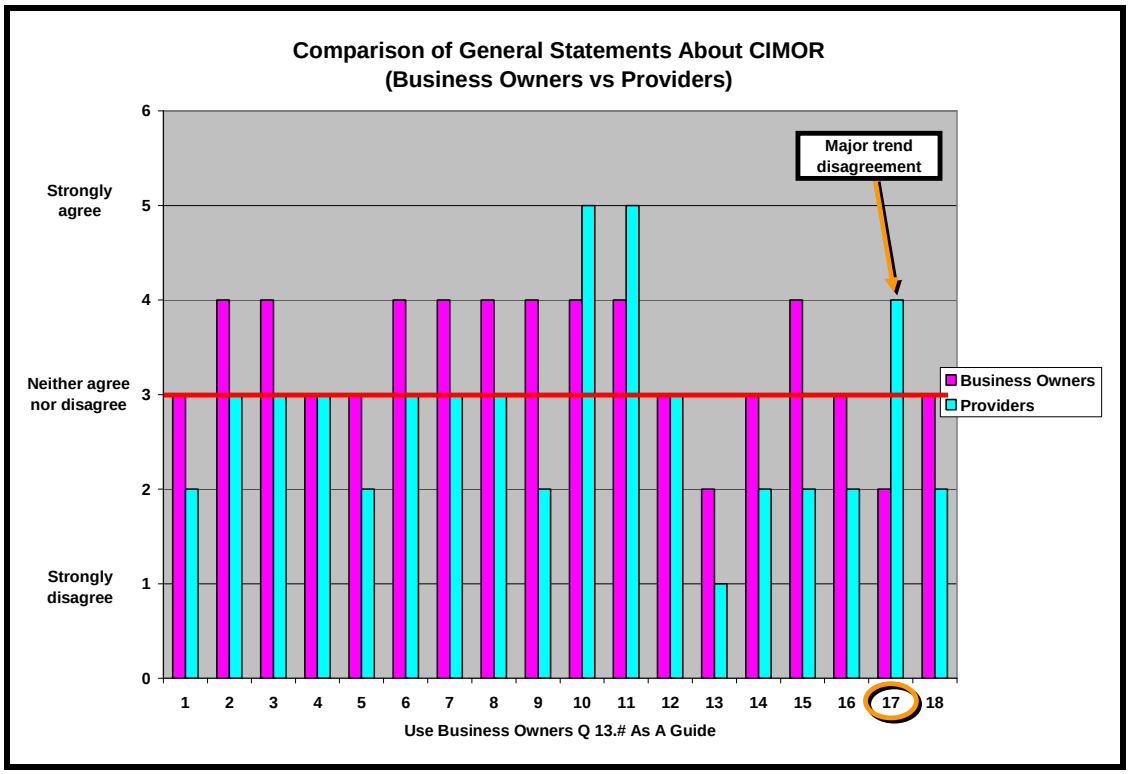


Figure 5 DMH Business Owners and Providers Perceptions (ITSD Omitted)

Looking at only the DMH business owners bars (magenta) in Figure 5, DMH business owners are somewhat positive about CIMOR.

Looking at only the provider bars (turquoise) in Figure 5, providers are somewhat negative about CIMOR.

But both DMH business owners and providers agree that system implementation testing (refer to Question 13 in Figure 3 and Figure 5) was not adequate.

During the interview process business owners were asked questions that solicited responses regarding various aspects of CIMOR. Some of these responses were categorized as either a strength or weakness. (This should not be confused with the specific question asking for interviewees to identify CIMOR's strengths and weaknesses.) While Section 3 provides detailed analysis of the interviews, Table 5 lists business owners' perceptions (actual comments) regarding CIMOR's strengths and weaknesses in no particular order. Table 6 does the same for providers.

Table 5 DMH Business Owners' Perceptions Regarding CIMOR's Strengths and Weaknesses

#	Strength	#	Weakness
1.	DMH needs a single information source and CIMOR is a move in that direction	1.	Multiple systems have to be used to obtain all the required data needed for business activities
2.	Provides people with a single system that has numerous functions, which formerly were in separate systems	2.	The data warehouse organization is too difficult to use (i.e., too hard to pull data out of it)
3.	Prior to CIMOR client demographics could not be determined	3.	In ability to generate ad hoc requests for the Governor and Legislature
4.	Data warehouse of medical claims current up to the last 24 hours	4.	Electronic Medical Records are not supported
5.	Standardized processes for provider reimbursement and cost reporting	5.	Data elements lack of standard definitions
6.	Business rules enforce compliance with federal standards, some contractual requirements and some core standards	6.	Business rule enforcement had the intended consequence of stopping payments but the unintended consequence of affecting almost all providers even though they were providing legitimate and appropriate healthcare services
7.	Good for auditing	7.	Some State legislators are very unhappy with CIMOR
8.	One integrated system for provider payments and consumer information	8.	Provider payment reporting is problematic because data have to be joined with data from legacy systems such as the purchase of service (POS)
9.	Data Integrity available in CIMOR improves our compliance with Federal Reporting requirements	9.	Because CIMOR is updated frequently, data is constantly changing, which means that reports run on one day do not match reports on the same data run on a later date
10.	Can now see what services a client has received at various DMH sites - in the past this could not be done	10.	Facilities are not accountable for entering discharge information (i.e., DMH can't accurately determine how long a patient is in treatment)
11.	CIMOR leaves a trail of consumer information	11.	Lack of performance and outcome data
12.	Automated interface between the CIMOR and SAM II systems, which saves data entry	12.	Does not interface with CyberAccess - CyberAccess is an excellent information source
13.	CIMOR contains data on provider payments, contracts and consumer banking that is needed for analysis and reporting	13.	Lack of historical data prevents trending and tracking
14.	Security is good	14.	The network and CIMOR will be unable to handle all the users expected when all DMH providers are moved to CIMOR
15.	Real-time web-based functionality with GUI screens	15.	Data warehouse may not be adequately sized to handle the additional volume of data (trending and cost data)
16.	CIMOR is used extensively for processing provider payments	16.	A void and re-bill processing capability is needed - no way for providers to correct and re-bill errors
17.	Very easy to use compared to the AS 400 systems	17.	Exception processing greatly expands the complexity - approximately 90% of invoices have to be modified prior to approval
18.	Can see funds allocations, expenses, and when providers are about to exhaust their allocated funds	18.	Fiscal priorities are always overriding healthcare delivery issues
19.	80 – 90% of business rules are currently implemented - enforces polices and rules that were never before enforced	19.	QuadraMed does not interface with CIMOR at the present
20.	One system with all data beginning to end of payment process	20.	Needed data not in CIMOR (e.g., does not have inpatient records from non-DMH inpatient facilities)
21.	Information is online real time for claims and banking	21.	Would like to see a data warehouse expressly for providers that they could access
22.	Providers now can see all their invoices and bills online	22.	Getting changes / enhancements introduced takes too long

#	Strength	#	Weakness
		23.	Would like to see more SAS training and support
		24.	Clinicians who do the input have no vested interest in accuracy of that data
		25.	Slow response time
		26.	System performance/response time problems
		27.	Only allow patient to be treated in one center at a time
		28.	Limited reports available
		29.	Double data entry
		30.	Claims processing doesn't work

The comments in Table 5 are qualitative results (as opposed to numerical rating results) indicating CIMOR strength and weakness issues from DMH business owners' perspectives. Clearly many of these do not address specific business functions (e.g., slow response time).

In order to collect objective and quantitative (i.e., numerical ratings) perceptions data, respondents were asked to indicate their level of agreement to the following statement "CIMOR currently meets my business unit's business needs with this business function" for each of the 46 business functions in column (2) in Table 2. Their responses are shown in Figure 6. (Values with "0" indicate that the function did not apply to their business unit and was not rated.)

Looking at Figure 6 we see that there are some perceptions that have a two point gap:

- Access to Recovery (ATR) (Q #1) shows that the business owners agree (4) that the function meets their business needs while the providers disagree (2) that it meets theirs.
- Authorization/Request/Approval/Review (Q #6) indicates that business owners agree (4) the function meets their needs while the providers disagree (2) that it meets theirs.
- Benefit Eligibility (Q #7) shows that providers agree (4) the function meets their needs while the business owners disagree (2) that it meets theirs.
- Delivered Services (Encounter Data Entry) (Q #18) indicates that business owners agree (4) the function meets their needs while the providers disagree (2) that it meets theirs.
- Diagnosis (Q #19) shows that business owners agree (4) the function meets their needs while the providers disagree (2) that it meets theirs.
- Fiscal Intermediary (Q #23) indicates that business owners agree (4) the function meets their needs while the providers disagree (2) that it meets theirs.
- MRDD Independent Supported Living (ISL) Budgets (Q #30) shows that providers strongly agree (5) the function meets their needs while the business owners neither agree nor disagree (3) that it meets theirs.
- Substance Abuse Traffic Offenders Program (SATOP) (Q #42) indicates that business owners agree (4) the function meets their needs while the providers disagree (2) that it meets theirs.

One of the significant points that should be mentioned here is that two (2) points is the largest gap between business owners and providers. This indicates that there are no extreme disagreements in perceptions (e.g., 4 points with 1 - Strongly disagree and 5 – Strongly agree).

Business Functions - Comparison - DMH Business Owners Vs. Providers

Question #	CIMOR currently meets my business unit's business needs with this business function.	Business Owners *	Providers *
1	Access to Recovery (ATR)	4	2
2	Accounts Payable (Adjudication)	4	3
3	Accounts Receivable (Claims Processing)	3	2
4	Administration (code tables and setups)	4	3
5	Assessments	4	3
6	Authorization/Request/Approval/Review	4	2
7	Benefit Eligibility	2	4
8	Case Management	3	3
9	Claims Adjudication and Payment	3	2
10	Claims Data Entry and Capture	4	2
11	Claims Error Resolution	2	2
12	Clinical Intake Screening	4	3
13	Complex Allocation Management	4	3
14	Consumer Banking	4	4
15	Consumer Demographics	4	3
16	Contact Management	4	3
17	Co-Pays that are not ATP	0	2
18	Delivered Services (Encounter Data Entry)	4	2
19	Diagnosis	4	2
20	DMH Intra-agency Communication	3	2
21	Eligibility Maintenance	3	3
22	Episode of Care/Commitments/Court Orders	4	3
23	Fiscal Intermediary	4	2
24	HIPAA Transaction Translation	4	3
25	HIPAA/EDI Trading Partner Maintenance and Certification	4	4
26	Human Resource Management	4	3
27	Incident Tracking & Reporting	3	3
28	Medical Record Maintenance	3	3
29	Medicare, Medicaid, and Private Insurance	3	2
30	MRDD Independent Supported Living (ISL) Budgets	5	3
31	Organization Management	5	4
32	Outcomes	3	2
33	Payer Plans	4	3
34	Practitioners	4	3
35	Prioritization in applying Standard Means Test (SMT)	3	2
36	Property/Bed Management	4	0
37	Provider Rate-setting	4	0
38	Provider/Contract Management	3	4
39	Registration/Admission/ Program Assignment	4	3
40	Sam II Link/SAM II HR Link	4	0
41	Standard Means Test (SMT) applied as serviced are delivered	3	2
42	Substance Abuse Traffic Offenders Program (SATOP)	4	2
43	Supported Community Living, used by both CPS and MRDD	3	3
44	Third Party Liability (TPL)	3	2
45	Utilization Review	3	2
46	Waiting Lists	2	2

* A zero value (i.e., 0.00) indicates the function was not rated

Figure 6 DMH Business Owners and Providers Perceptions regarding CIMOR Business Functions

Another observation is that in all but one instance (i.e., Q #7 Benefit Eligibility) the business owners have a more favorable view that CIMOR meets their business needs.

To obtain a numerical view of the business owners' perceptions, examine Figure 8. This figure shows the business owners' ratings sorted in descending order.

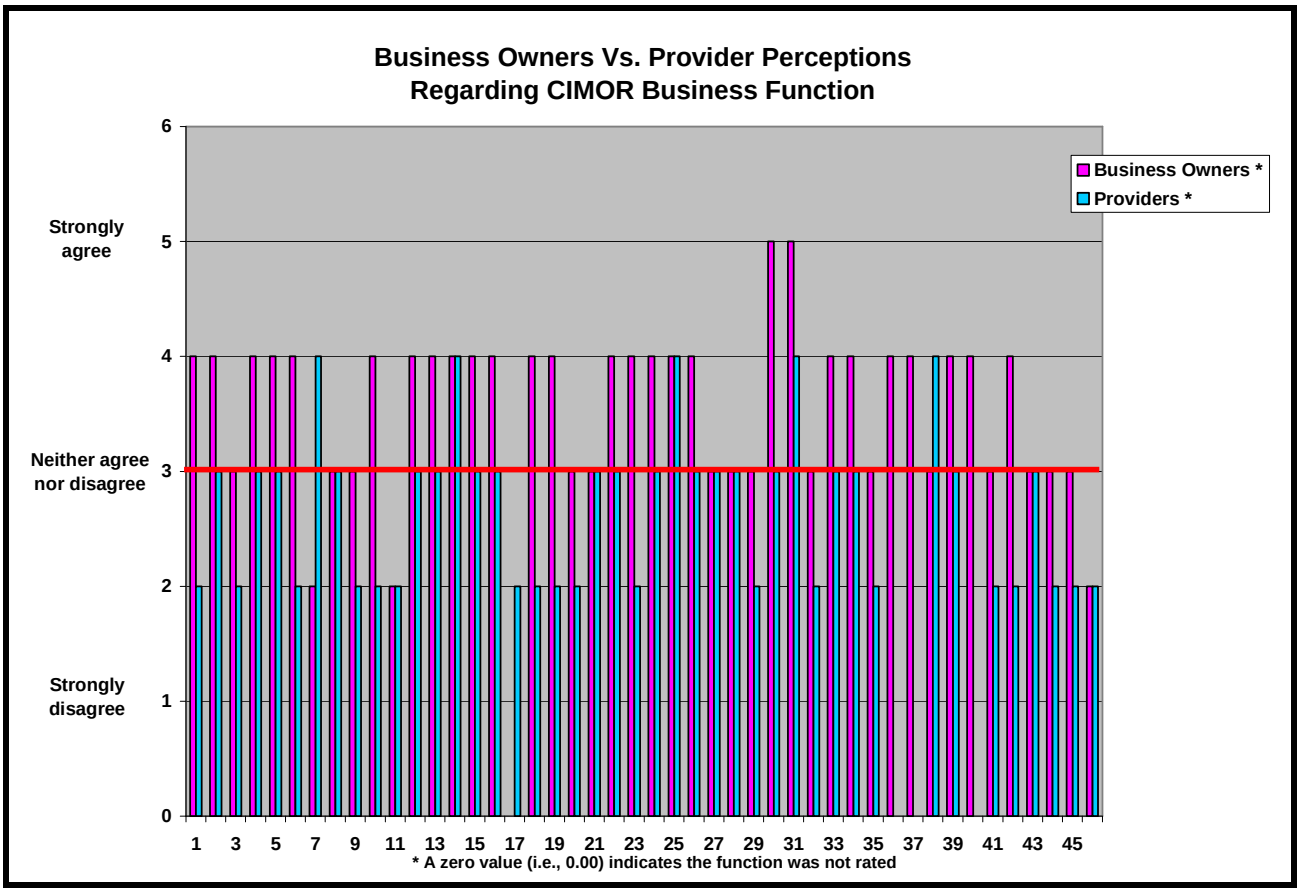


Figure 7 DMH Business Owners and Providers Perceptions of Business Functions

Business Functions - DMH Business Owners Perceptions

Question #	CIMOR currently meets my business unit's business needs with this business function.	Business Owners *
30	MRDD Independent Supported Living (ISL) Budgets	5
31	Organization Management	5
1	Access to Recovery (ATR)	4
2	Accounts Payable (Adjudication)	4
4	Administration (code tables and setups)	4
5	Assessments	4
6	Authorization/Request/Approval/Review	4
10	Claims Data Entry and Capture	4
12	Clinical Intake Screening	4
13	Complex Allocation Management	4
14	Consumer Banking	4
15	Consumer Demographics	4
16	Contact Management	4
18	Delivered Services (Encounter Data Entry)	4
19	Diagnosis	4
22	Episode of Care/Commitments/Court Orders	4
23	Fiscal Intermediary	4
24	HIPAA Transaction Translation	4
25	HIPAA/EDI Trading Partner Maintenance and Certification	4
26	Human Resource Management	4
33	Payer Plans	4
34	Practitioners	4
36	Property/Bed Management	4
37	Provider Rate-setting	4
39	Registration/Admission/ Program Assignment	4
40	Sam II Link/SAM II HR Link	4
42	Substance Abuse Traffic Offenders Program (SATOP)	4
3	Accounts Receivable (Claims Processing)	3
8	Case Management	3
9	Claims Adjudication and Payment	3
20	DMH Intra-agency Communication	3
21	Eligibility Maintenance	3
27	Incident Tracking & Reporting	3
28	Medical Record Maintenance	3
29	Medicare, Medicaid, and Private Insurance	3
32	Outcomes	3
35	Prioritization in applying Standard Means Test (SMT)	3
38	Provider/Contract Management	3
41	Standard Means Test (SMT) applied as serviced are delivered	3
43	Supported Community Living, used by both CPS and MRDD	3
44	Third Party Liability (TPL)	3
45	Utilization Review	3
7	Benefit Eligibility	2
11	Claims Error Resolution	2
46	Waiting Lists	2
17	Co-Pays that are not ATP	0

* A zero value (i.e., 0.00) indicates the function was not rated

Figure 8 DMH Business Owners Function Perceptions Sorted by Scores

Figure 8 shows that DMH business owners “strongly agree” that the following 2 (4%) functions meet their business unit’s needs:

- MRDD Independent Supported Living (ISL) Budgets
- Organization Management.

Figure 8 also shows that DMH business owners "agree" that the following 25 (54%) functions meet their business unit's needs:

- Access To Recovery (ATR)
- Accounts Payable (Adjudication)
- Administration (code tables and setups)
- Assessments
- Authorization/Request/Approval/Review
- Claims Data Entry and Capture
- Clinical Intake Screening
- Complex Allocation Management
- Consumer Banking
- Consumer Demographics
- Contact Management
- Delivered Services (Encounter Data Entry)
- Diagnosis
- Episode of Care/Commitments/Court Orders
- Fiscal Intermediary
- HIPAA Transaction Translation
- HIPAA/EDI Trading Partner Maintenance and Certification
- Human Resource Management
- Payer Plans
- Practitioners
- Property/Bed Management
- Provider Rate-setting
- Registration/Admission/ Program Assignment
- Sam II Link/SAM II HR Link
- Substance Abuse Traffic Offenders Program (SATOP)

Figure 8 shows that DMH business owners "neither agree nor disagree" that the following 15 (33%) functions meet their business unit's needs:

- Accounts Receivable (Claims Processing)
- Case Management
- Claims Adjudication and Payment
- DMH Intra-agency Communication
- Eligibility Maintenance

- Incident Tracking & Reporting
- Medical Record Maintenance
- Medicare, Medicaid, and Private Insurance
- Outcomes
- Prioritization in applying Standard Means Test (SMT)
- Provider/Contract Management
- Standard Means Test (SMT) applied as serviced are delivered
- Supported Community Living, used by both CPS and MRDD
- Third Party Liability (TPL)
- Utilization Review

Finally, Figure 8 shows that DMH business owners "disagree" that the following 3 (7%) functions meet their business unit's needs:

- Benefit Eligibility
- Claims Error Resolution
- Waiting Lists

DMH business owners perceive 27 (59%) of the 46 business function as being four (4) or above. While business owners definitely believe opportunities for improvement are present, business owners is generally pleased with CIMOR.

Compared to DMH business owners, providers see a different CIMOR.

Table 6 lists provider's perceptions (actual comments) regarding CIMOR's strengths and weaknesses in no particular order. (This should not be confused with the specific question asking interviewees to identify CIMOR's strengths and weaknesses.)

Table 6 Provider's Perceptions Regarding CIMOR's Strengths and Weaknesses

#	Strength	#	Weakness
1.	Potential to become an effective records management system	1.	We enter what we have to enter and do what we have to do to get paid
2.	Like web base	2.	Data isn't always reliable
3.	Takes IT load off as don't have to manage the system locally	3.	There are issues in conversion from old to new system
4.	Basic structure is easy to navigate	4.	Data on screen did not always match data printed out
5.	Data seems reliable	5.	Duplication of effort increases workload and time involved
6.	Tracking allocations is useful	6.	Enable better outcomes evaluation and national comparisons
7.	Multi-user access to electronic assessment	7.	Slow, rigid, cumbersome
8.	Seeing previous treatment history	8.	Encourages incomplete and poor data collection - enter inaccurate data if system won't take the actual data
9.	Can get information right away	9.	Cannot use missing data when is truly missing
10.	Business rules have helped to look internally at own systems and do internal trouble shooting and system corrections	10.	Business rules encourage bad data when need to bill by a certain date

#	Strength	#	Weakness
11.	Provides checks and balances	11.	Duplicate clients are a huge issue
12.	Can do sample encounter checks more easily	12.	Find lots of incorrect data - difficult to change and have to go thru IT
13.	Encounters coincide with services	13.	Backlogs of unauthorized services because of billing backlog
14.	Helps meet reporting requirements and is moving in right direction	14.	Rejections/denials are not coming with a reason code
15.	More useful than their previous system even in current capacity	15.	Changes are not being communicated to providers
16.	Nice to see client benefits and spend down	16.	Cannot discharge persons when there are non-authorized services on file - with Medicaid this is a big problem since they have to wait for the next billing cycle
17.	Nice to see check authorizations	17.	Cannot assume chronological billing or services in addiction treatment - makes cumbersome to meet business rules
18.	Having one versus multiple systems	18.	Email spam filter may screen out emails to the organization from IT
19.	Auditing is easier	19.	Communicated that problems were providers' fault, really hurt morale; have not been open about system problems.
20.	Client program service history is useful	20.	Training didn't reflect what was actually rolled out
21.	CIMOR can be useful	21.	Authorizations and void and re-bill are problem areas
22.	Eligibility piece one of CIMOR strengths	22.	Input what's required by contract
23.	Using CIMOR speeds processes	23.	Created a huge setback in clinical services
24.	Get quick turnaround on confirmations	24.	Data collection burden on the clinician - erodes time for counseling
25.	Ability to batch	25.	Changing of business rules was a weakness
		26.	Utilization and authorization process is cumbersome
		27.	It would be better if they could get data out of it
		28.	Provide services in some areas that do not have DSL
		29.	Response to clinical reviews has been slow
		30.	DMH could use an automatic notification to alert reviewers
		31.	Expense of DSL
		32.	Receive emails only regarding system status - nothing on system upgrades or changes
		33.	Do not have a valid sign on anymore
		34.	CIMOR is not efficient - can get quicker response by calling the DMH office
		35.	Can get along without CIMOR - does not really provide any added benefit
		36.	Cumbersome to get information from it
		37.	Have own internal system, must keep CIMOR demographics updated but don't use for day to day operations
		38.	Can't print CIMOR reports
		39.	If could use for own billing would do so but can't generate own billing through system
		40.	Cannot see entire room & board picture for a resident
		41.	Have to go to multiple screens to get needed information
		42.	It is easier to go around until everything is in place
		43.	Communication is poor and receive mixed messages

#	Strength	#	Weakness
		44.	What happens if everyone signing on at same time to get in billing?
		45.	Eligibility data is not reliable
		46.	Better reconciliation reporting
		47.	Capability to list or report instead of looking up each individual claim
		48.	Providers were never consulted until close to implementation
		49.	Primary concern is whether lessons learned can continue to be applied
		50.	CIMOR doesn't have clinical records, so still have to request records
		51.	Biggest weakness is apparent CIMOR created to be a direct entry system
		52.	Not user friendly and doesn't have complete edits on all fields
		53.	Can't use arrow keys to navigate
		54.	Must do manual billing on many clients
		55.	Old system worked better
		56.	Huge outstanding receivables without knowing what will happen, don't know how to fix it
		57.	CIMOR can't have clients in two programs at the same time
		58.	Descriptions of selections are not clear so may have to submit several times to get all access needed
		59.	Clinicians got no training
		60.	Moving toward Electronic Medical Record (EMR) internally
		61.	Can't tell if SSI information is correct, doesn't mesh with client report
		62.	Bugs in authorization
		63.	Too date/time sensitive
		64.	Not very user friendly
		65.	Limitation of only having one episode of care open at a time

The comments in Table 6 are qualitative results (as opposed to numerical results) indicating CIMOR strength and weakness issues from providers' perspectives. Clearly many of these do not address specific business functions (e.g., expense of DSL). In order to collect objective, quantitative (i.e., numerical ratings) perception data, providers were asked to indicate their level of agreement to the following statement "CIMOR currently meets my business unit's business needs with this business function" for each of the 46 business functions in column (2) in Table 2. Each respondent was asked to indicate their level of agreement with each statement using the 1 – 5 scale shown in Table 1.

For example given the statement "CIMOR meets user needs," if the respondent agreed with that statement, he / she would answer "4." If he / she disagreed with the statement, then the answer would be "2."

Provider responses are shown in Figure 9. Values with "0" indicate that the function was not applicable for the provider's business unit; thus not rated.

Figure 9 shows that providers "agree" that the following 5 (11%) functions meet their business unit's needs:

- Benefit Eligibility
- Consumer Banking
- HIPAA/EDI Trading Partner Maintenance and Certification
- Organization Management
- Provider/Contract Management.

Figure 9 also shows that providers "neither agree nor disagree" that the following 19 (41%) functions meet their business unit's needs:

- Accounts Payable (Adjudication)
- Administration (code tables and setups)
- Assessments
- Case Management
- Clinical Intake Screening
- Complex Allocation Management
- Consumer Demographics
- Contact Management
- Eligibility Maintenance
- Episode of Care/Commitments/Court Orders
- HIPAA Transaction Translation
- Human Resource Management
- Incident Tracking & Reporting
- Medical Record Maintenance
- MRDD Independent Supported Living (ISL) Budgets
- Payer Plans
- Practitioners
- Registration/Admission/ Program Assignment
- Supported Community Living, used by both CPS and MRDD

Business Functions - Provider Perceptions

Question #	CIMOR currently meets my business unit's business needs with this business function.	Providers *
7	Benefit Eligibility	4
14	Consumer Banking	4
25	HIPAA/EDI Trading Partner Maintenance and Certification	4
31	Organization Management	4
38	Provider/Contract Management	4
2	Accounts Payable (Adjudication)	3
4	Administration (code tables and setups)	3
5	Assessments	3
8	Case Management	3
12	Clinical Intake Screening	3
13	Complex Allocation Management	3
15	Consumer Demographics	3
16	Contact Management	3
21	Eligibility Maintenance	3
22	Episode of Care/Commitments/Court Orders	3
24	HIPAA Transaction Translation	3
26	Human Resource Management	3
27	Incident Tracking & Reporting	3
28	Medical Record Maintenance	3
30	MRDD Independent Supported Living (ISL) Budgets	3
33	Payer Plans	3
34	Practitioners	3
39	Registration/Admission/ Program Assignment	3
43	Supported Community Living, used by both CPS and MRDD	3
1	Access to Recovery (ATR)	2
3	Accounts Receivable (Claims Processing)	2
6	Authorization/Request/Approval/Review	2
9	Claims Adjudication and Payment	2
10	Claims Data Entry and Capture	2
11	Claims Error Resolution	2
17	Co-Pays that are not ATP	2
18	Delivered Services (Encounter Data Entry)	2
19	Diagnosis	2
20	DMH Intra-agency Communication	2
23	Fiscal Intermediary	2
29	Medicare, Medicaid, and Private Insurance	2
32	Outcomes	2
35	Prioritization in applying Standard Means Test (SMT)	2
41	Standard Means Test (SMT) applied as serviced are delivered	2
42	Substance Abuse Traffic Offenders Program (SATOP)	2
44	Third Party Liability (TPL)	2
45	Utilization Review	2
46	Waiting Lists	2
36	Property/Bed Management	0
37	Provider Rate-setting	0
40	Sam II Link/SAM II HR Link	0

* A zero value (i.e., 0.00) indicates the function was not rated

Figure 9 DMH Providers Function Perceptions Sorted by Scores

Finally Figure 9 shows that providers “disagree” that the following 19 (41%) functions meet their business unit’s needs:

- Access To Recovery (ATR)
- Accounts Receivable (Claims Processing)

- Authorization/Request/Approval/Review
- Claims Adjudication and Payment
- Claims Data Entry and Capture
- Claims Error Resolution
- Co-Pays that are not ATP
- Delivered Services (Encounter Data Entry)
- Diagnosis
- DMH Intra-agency Communication
- Fiscal Intermediary
- Medicare, Medicaid, and Private Insurance
- Outcomes
- Prioritization in applying Standard Means Test (SMT)
- Standard Means Test (SMT) applied as serviced are delivered
- Substance Abuse Traffic Offenders Program (SATOP)
- Third Party Liability (TPL)
- Utilization Review
- Waiting Lists

3.4.1 Summary

As shown in Figure 1 only ITSD perceives that overall CIMOR is "good." During the interviews the perception developed that ITSD views CIMOR as a comprehensive, sophisticated, state-of-the-art software tool. And it is. But CIMOR is much more than that. Business Owners and providers view CIMOR as a business tool. However providers would prefer not to have this business tool since they perceive it hinders healthcare delivery.

From the DMH business owners' perspective CIMOR has the expected fundamental capabilities for such a mental and behavioral healthcare system. That is, CIMOR can process claims, capture and store information, etc. For the most part CIMOR users want, and need, CIMOR to be improved so that they may more efficiently and effectively perform their jobs.

From DMH business owners' perspective one major CIMOR activity is business rule enforcement. DMH business owners want business rules to be enforced to ensure legal, funding, contract, payment, and grant conditions are followed. This single issue is central to CIMOR's present reputation.

Generally most people believe that providers should be paid to provide good services. The converse is also true that many people believe that providers should not be paid when they do not perform a service or when the service is performed in a substandard way. Philosophically some State Legislators and State governmental employees are thought to believe that a good point at which to provide this "Pay for Performance" concept is when the check for services rendered is generated. Toward this end CIMOR has various business rules to aid in ensuring

"Pay for Performance" is enabled. Unfortunately this business rules implementation had the unintended consequence of causing many providers to remain uncompensated for legitimate services rendered. Approximately ten (10) business rules were found to be preventing payment. These rules have been suspended for some indefinite time period.

Regardless, to business owners DMH business rule enforcement is perceived as a significant CIMOR advantage. To providers business rule enforcement is perceived as an administrative burden that stops claims payment and represents the potential for going out of business.

Interviewed providers indicate that they have large, uncompensated dollar amounts at risk for legitimate services delivered, and they do not know how to resolve the situation. Moreover, they do not know if they will ever receive payment.

This report is not an analysis of why payments were not made. Further, this report's intent is not to either identify or place responsibility for the payment situation arising. But what this report does do is discover that CIMOR was simply the tool used to enforce business rules that resulted in claims being rejected. That is, CIMOR performed the task that the Department of Mental Health wanted performed: gather data necessary for federal grant reporting and make payments for legitimate and effective mental health services performed.

While CIMOR did the job it was assigned to do (i.e., enforce DMH defined business rules), the law of unintended consequences also had the affect of creating a situation where legitimate and effective mental health services were not compensated because of failure to adhere precisely to various administrative procedures and dates.

Not getting paid certainly focuses one's attention. The logical thought process is "Since the situation did not exist before CIMOR began enforcing various rules, then the problem must be due to CIMOR."

People view almost any change with some trepidation. Change that affects the way one does their work is even more worrisome. CIMOR is a big change. The filter of non-payment affects provider's view of every aspect of CIMOR.

Providers want to deliver mental and behavioral healthcare services. They don't have time to learn a new system that they perceive does not help them do this. Some providers have their own internal systems and see no need to duplicate work internally when things seemed to be working well before CIMOR's introduction: if it isn't broken, don't fix it.

As a result many of the qualitative comments in Table 6 focus not so much on business functions but demonstrate frustrations with a system that prevents providers from doing activities perceived as important: mental and behavioral healthcare and of course getting paid for it.

The perception differences demonstrate that CIMOR's functionalities are serving business owner needs much better than provider business needs at this point, and that functions that work well for one group do not necessarily meet the business needs of another.

CIMOR definitely has opportunities for improvement, but it is also a victim (as are DMH and providers) of circumstances.

3.5 CIMOR Identified Strengths and Weaknesses

Provider interview question #10 asked respondents what they saw as CIMOR's strengths while question #11 asked for weaknesses. CIMOR strengths generally agreed upon by all groups include:

- Users prefer having a single point of entry and access to data
- There is a wealth of information being captured and stored in the system
- There are some gains in functionality and ease of certain processes and access to some information
- Billing and batch data entry works well
- Quicker, better access to consumer information, such as demographics and treatment history
- Multiple departments/users within a facility can all access the same information

CIMOR weaknesses generally agreed upon included:

- Difficulty in getting data out of CIMOR and in using the data warehouse
- Varying perceptions of data quality
- Missing data elements and data inconsistencies; providers described data quality as poor and incomplete as a result of having to comply with business rules for payment
- Duplication and non-congruence of systems, information and effort
- Voids and re-bill process does not work
- Some processes, particularly prior authorization and utilization review, are cumbersome, taking too much time and effort
- Duplication of effort with data entry into legacy and/or provider internal systems
- Some functionality is missing and/or not yet optimal
- Still need to use legacy systems and paper records for missing information or because cannot get it from CIMOR
- Lack of timely and appropriate training for all users; need more and better training
- Issues with diagnoses entry of 5 axes
- Having to discharge a consumer from one provider before the consumer can be admitted to another provider.

A detailed breakdown of perceived strengths and weaknesses by user group are provided in the table below. Bullet points identified by a diamond in Table 7 indicate those most often mentioned in interviews.

Table 7 CIMOR Strengths and Weaknesses

Interviewees	Strengths	Weaknesses
Business Owners	❖ Online real time web based system using screens ❖ Quicker, better access to consumer information, such as demographics and treatment history ❖ Providers have access to more financial information than with the legacy systems ❖ Ability to strictly enforce business rules ▪ Easy to use compared to legacy systems ▪ Security roles are useful ▪ Corrections can be performed in one system (for financial data) ▪ Ability to see data from beginning to end of a payment	▪ Lacks standard reports ▪ Insufficient testing prior to CIMOR implementation ▪ Claims processing and claims reconciliation processes need improvement, particularly in timeliness
Providers	❖Allocation tracking works well ❖ Access to eligibility information to determine eligibility ▪ Ability to link encounters to services ▪ Business rules help with internal system troubleshooting ▪ Some information access, functions and views work well (episode of care, auditing)	❖ A long learning curve is needed by most users before they can effectively use the system ❖ Major impact on service provision; shifts a great deal of data collection to professional staff ❖ Poor communications with DMH ❖ Difficult to reconcile billed to paid claims ❖ Insufficient feedback when errors occur or information/claims are rejected ❖ Some system processes cause service issues, such as the requirement that a consumer be discharged from one provider before another provider may enter an admission for the consumer ❖ Changing business rules makes it difficult to meet system requirements and process bills in a timely manner ❖ Making changes to the information in CIMOR is often difficult ▪ Need more flexibility for data entry, such as being able to record missing data when truly missing, reduce date/time sensitivity, remove requirement that services be chronological ▪ Progression through screens is not intuitive

4 Review of Billing Processes

FOX conducted an analysis of the current status of claims and transactions processes, including prior authorization, which are facilitated through CIMOR. Documentation on the billing process and claims process flow was requested from DMH. Transactions include Billing, Authorizations, Encounters, Vouchers, and Waivers. Billing is based on delivery of services or encounters, as they are referred to in CIMOR. Claims/encounters can be reimbursed by many different payers including Medicaid, Medicare, commercial insurance, private pay, and others. There are also many vehicles for monitoring services prior to payment, including pre-authorization, Vouchers (allows service options and level), or ISL budget which tracks assigned resources and services provided.

Provider use of CIMOR for claims/encounter function is currently variable across the three DMH divisions. ADA providers are currently using all the available functions in CIMOR, including the claims/encounter function. Facility and residential providers for both CPS and MRDD residential providers are also using the claims/encounter function.

CPS providers and MRDD non-residential providers are not yet billing through CIMOR. To submit Medicaid claims, CPS providers currently submit X12N 837P claims to, and receive their X12N 835s directly from Medicaid. DMH also receives a copy of the Medicaid X12N 835 and applies the OHCDS process and sends invoices to SAM II to make the provider payment. To bill general revenue CPS providers use the DMH legacy POS system. MRDD provider billing for both Medicaid and General Revenue is currently done using the MRDDIS legacy system.

The description of the claims/encounter process below currently applies primarily to ADA providers, but eventually all three divisions will be using CIMOR for all claims/encounter processing.

4.1 CIMOR Claims/Encounter Submission Processes

Currently, ADA, CPS, and MRDD Residential providers and State-owned Facilities are using CIMOR for billing.

The DMH claims/encounter process in CIMOR is accomplished through two different pathways: direct data entry online in CIMOR or HIPAA compliant batch transactions.

1. Billing information may be entered online into the CIMOR system by providers through the Internet via a series of screens that collect information for billing such as the following: client demographics, diagnosis, service, dates, and voucher. Online submission is real time, so the claim/encounter information is then subjected to front end edits (e.g., eligibility, contracted provider, etc.) and business rules. When all data needed to complete the claim/encounter is not submitted or the service does not meet edit criteria (e.g., not authorized; at the wrong level, etc.), the encounter is rejected on the CIMOR screen and the provider is given an opportunity to correct the error prior to moving the encounter through the system. When all required data for the claim/encounter has been entered, the encounter is accepted and forwarded to Payer Determination.
2. Claims/encounters may be submitted via batch from providers to CIMOR. In this scenario, claims are forwarded as a HIPAA compliant X12N 837P transaction via file transfer protocol (FTP) through a translator to CIMOR and the standard HIPAA 997 file

is returned to the provider. These claims/encounters are then subjected to the same process described above for online claim/encounter entry applying the same business rules. The provider receives a claims confirmation file for all accepted and rejected claims/encounters. Accepted encounters are then forwarded through CIMOR to the Payer Determination Process.

After online or batch entry, the accepted claim/encounter is sent through a payment determination decision point where the payer is identified and claims/encounters forwarded to the appropriate billing process: Medicaid, General Revenue or other payer.

1. **Medicaid Billing Process:** Additional information is added at this point to all claims/encounters billable to Medicaid to complete the required elements for the X12N 837P. Claims are forwarded from CIMOR via Network Data Mover (NDM) to the Medicaid Fiscal Agent using a standard X12N 837P transaction and the required 997 is returned to DMH. These claims/encounters are processed within the Medicaid Management Information System (MMIS) using Medicaid payment logic and a payment file is sent to SAM II where an aggregate funds transfer occurs to the DMH appropriations account.

   The MMIS also receives and processes X12N 837I/P transactions directly from CIMOR on behalf of the DMH facilities and CIMOR receives the required 997 transaction from Medicaid.

   Following the Medicaid payment cycle, Medicaid sends an X12N 835 to DMH for ***all*** DMH providers' claims/encounters submitted to CIMOR including providers submissions online or batch. The returned X12N 835 information is loaded into CIMOR. CIMOR applies the OHCDS processing and sends and invoice to SAM II to make the provider payments.

2. **General Revenue Billing Process:** For claims/encounters captured in CIMOR through online submission or batch transfer and determined to be reimbursed through General Revenue an invoice is created and sent through BizTalk to SAM II for payment. If the original claim/encounter was submitted to as an X12N 837P, an X12N 835 is created and returned to the provider.

   All CIMOR claims/encounters to be paid by DMH General Revenue are aggregated on an internal invoice. Every two weeks the invoices are approved and using a BizTalk translator creates a transaction file which is sent to SAM II for processing. The batch file is uploaded to SAM II for payment and a check is printed or an Electronic Funds Transfer (EFT) is generated to the provider's bank. The payment information, including the check number or EFT payment information, is then stored in the SAMII data warehouse, and ultimately electronically forwarded back to CIMOR for loading and made available for online query. For providers who submitted an X12N 837P batch transaction, the payment information is forwarded through the BizTalk translator to produce and send the required X12N 835 transaction/ remittance advice to the provider.

3. **Other Payers Billing Process (for DMH Facilities):** Another output of the Payer Determination process are those claims that need to be filed with Medicare, private insurance companies or others payers (e.g., Employee Self-Insured Plan). These represent a very small number of the total DMH claims/encounters. Currently, these claims/encounters are forwarded to ClaimBuilder where a standard X12N 837P/I is created and sent via FTP to the appropriate third party payer. (Legacy processes are

also used to bill the third party payer.) The payer responds initially with the required 997 transaction and after claims processing with a standard X12N 835. Payments are manually posted to SAM II. SAMII creates the check or EFT payment to the bank for the provider.

Medicare claims are built by combining CIMOR data with additional data entry as needed through the Claimbuilder to create X12N 837I/Ps. Private insurance claims use a similar process, using Claimbuilder to print data for insurance claims.

The Claimbuilder process is being rebuilt and integrated into CIMOR, which will eliminate the use of legacy processes in the other payer billing area.

A graphic depicting the current DMH Encounter and Billing Processes is shown below in Figure 10. Processes highlighted in green are external to CIMOR.

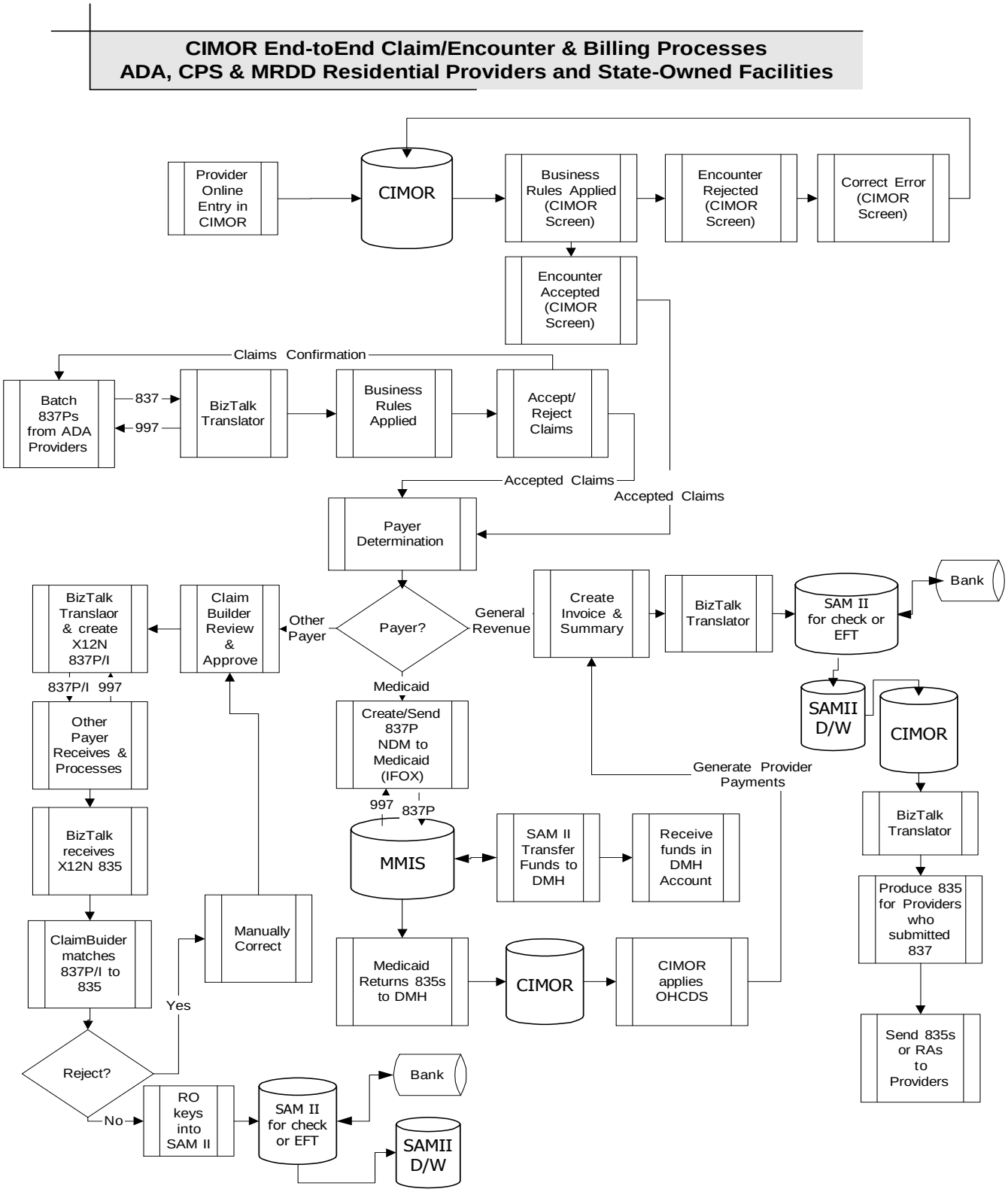


Figure 10 CIMOR End-to-End Claim/Encounter & Billing Processes

4.2 Claims and Encounter Processes External to CIMOR

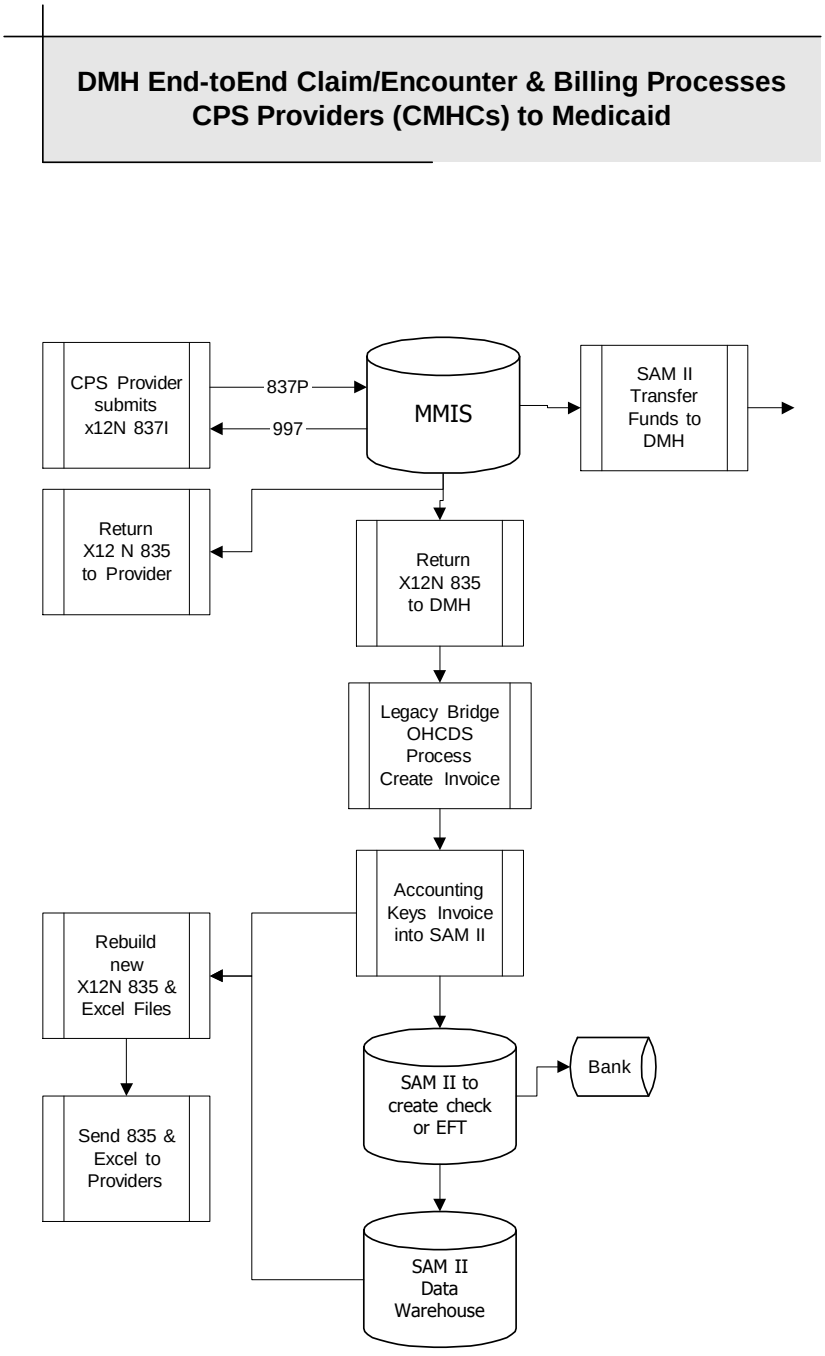
There are three claims/encounter billing processes currently performed external to CIMOR for CPS and MRDD Non-residential providers as follows.

4.2.1 CPS Providers Medicaid Billing Process

The CPS providers currently submit their X12N 837P transactions directly to the MMIS and receive a corresponding 997 transaction. Claims are adjudicated using Medicaid business rules and sent to SAM II for payment. Payment is made to the DMH; not the provider. The funds are transferred by SAM II to the DMH account. The MMIS returns a required X12N 835 directly to the CPS provider and sends an X12N 835 to the DMH for all DMH providers (those submitting claims directly to the MMIS and those for whom CIMOR creates and sends a claim.).

The X12N 835s received from Medicaid for CPS providers are sent to the Legacy Bridge where the OHCDS process occurs and an invoice is created. The invoice is forwarded to SAMII, where the state's accounting system creates the check or EFT for the provider. The payment information is then sent to SAM II Data Warehouse and the Legacy Bridge rebuilds a new X12N 835, including information on the OHCDS payment, and the required X12N 835 and an Excel file are sent to the provider.

Refer to CPS providers Billing Process to Medicaid in Figure 11 below. Note that all processing occurs external to CIMOR. This billing process will be eliminated and the Legacy Bridge retired following implementation of the CPS provider billings into CIMOR.



Green identifies systems external to CIMOR

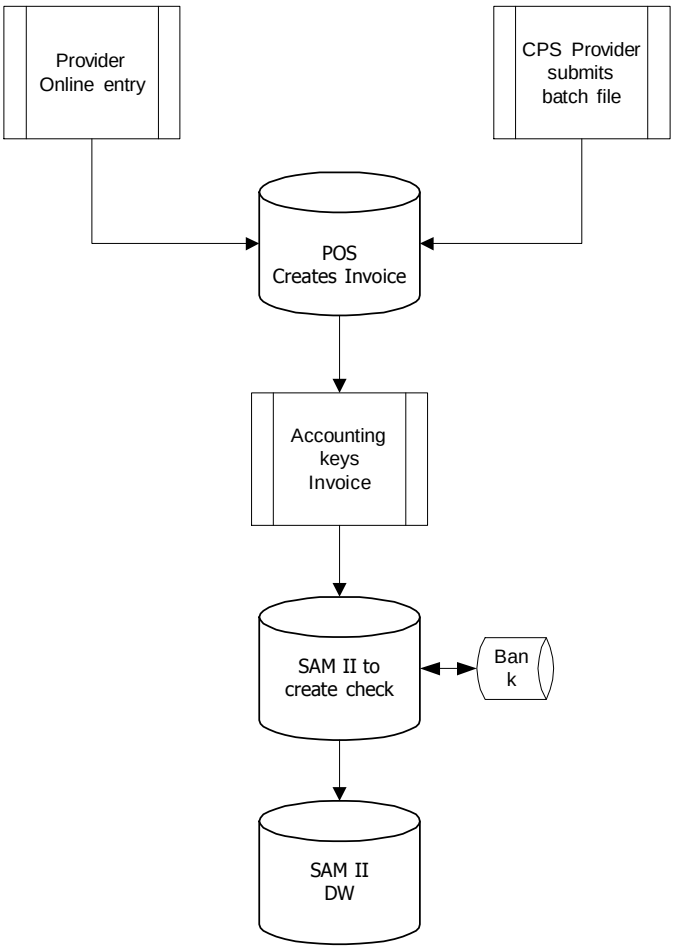
Figure 11 CPS Providers General Revenue Billing Process

4.2.2 CPS Provider General Revenue Billing Process

The CPS providers may enter claims/encounters for services rendered through direct data entry online into the Purchase of Services (POS) system or through batch file submissions to DMH. The POS system creates an invoice for all submitted claims/encounters and the DMH Accounting Staff review the invoice and key an invoice into SAM II and a check is produced for the provider. A file with payment information is sent and received from the bank with information regarding the check number, amount, etc. The payment file from the bank is then loaded into the SAM II Data Warehouse and available for reporting.

Note that all processing occurs external to CIMOR at this time. This billing process will be eliminated and the POS System retired following implementation of the CPS provider General Revenue Billings into CIMOR. A graphic depicting the General Revenue Billing Process is shown in Figure 12 below.

DMH End-toEnd Claim/Encounter & Billing Processes
CPS Providers (CMHCs) General Revenue



Green identifies systems external to CIMOR

Figure 12 CPS Providers General Revenue Billing Process

4.2.3 MRDD Non-residential Provider Billing Process

The MRDD Non-residential provider Billing Process begins with the Case Manager enter of authorized services into MRDD Information System (MRDDIS). When services are rendered, the provider through direct data enter submits a claim/encounter in MRDDIS. The claim is edited for payer determination and processed as follows:

1. All claims/encounters are forwarded to the POS system where an invoice is created. The DMH Accountant keys the invoice into SAM II and SAM II creates a check or EFT, which is sent to the provider and/or provider's bank respectively. A payment file is then sent to SAM II Data Warehouse and made available for reporting.
2. If the claim/encounter is for a Medicaid eligible consumer, the claim is forwarded to the Legacy Bridge where the translator creates an X12N 837P. The X12N 837 is sent in batch to the MMIS for payment and the MMIS immediately sends back a 997 transaction. The claim is then processed through the MMIS and payment is made based upon Medicaid business rules. If the claim/encounter is reimbursed, the claim is forwarded in the payment file to SAM II and payment is transferred to the DMH account. The MMIS then generates an X12N 835, which is returned to the Legacy Bridge for processing. If the transaction is denied, the Reimbursement Officer corrects the identified error and rebuilds the transaction within the Legacy Bridge. If the transaction is paid a lesser amount than the amount reimbursed by DMH for the corresponding claim in the POS system processing as described in #1 above, the claim is manually reviewed and identified for offset recovery on the next POS payment cycle. The Accountant keys the offset amount into SAM II.

Note that all processing occurs external to CIMOR at this time. This billing process will be eliminated and the POS System retired following implementation of the MRDD Non-residential providers Billings into CIMOR. A graphic depicting the MRDD Non-residential provider Billing Process is shown in Figure 13 below.

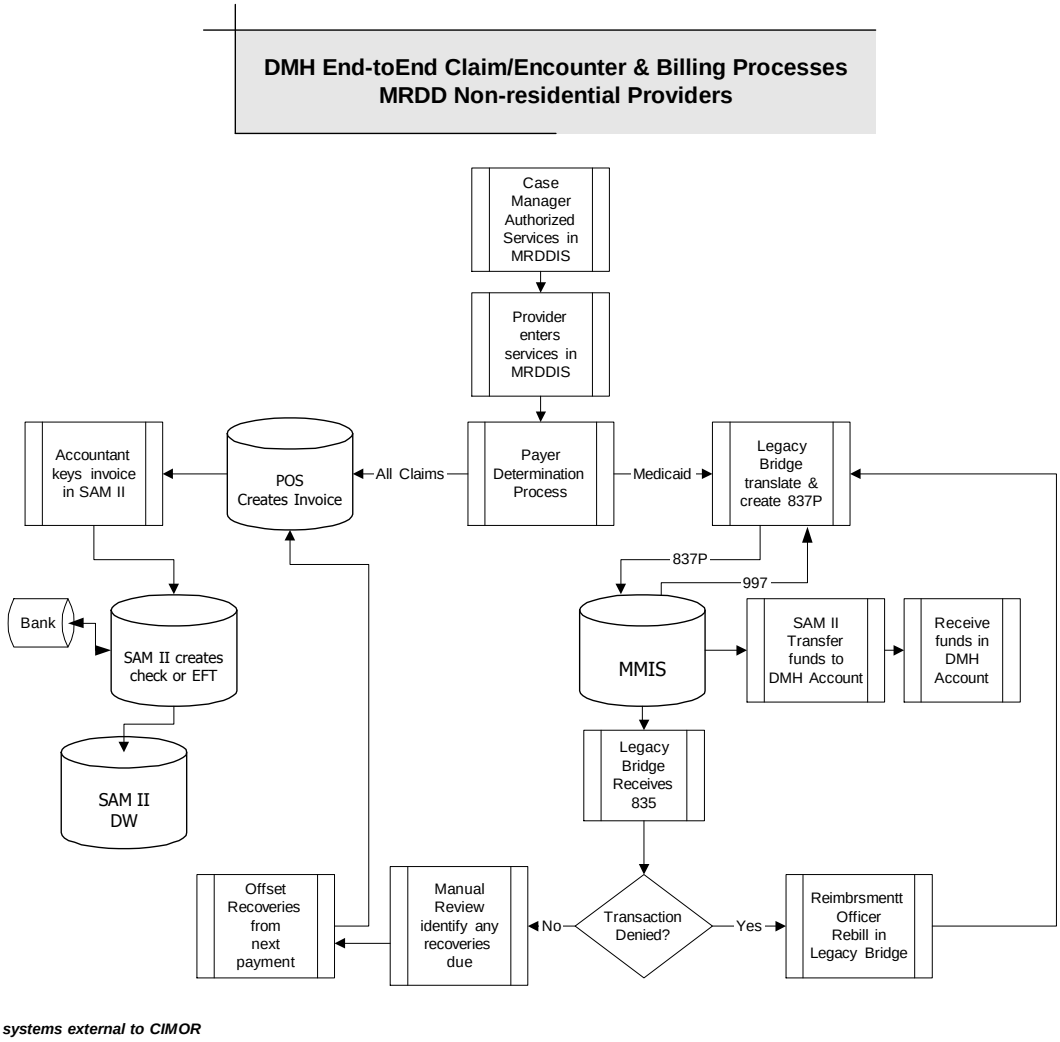


Figure 13 MRDD Non-residential Provider Billing Process

4.3 Claims Voids & Re-bills (Adjustments) Process

Void and re-bill functionality was not initially part of the CIMOR system and has resulted in a backlog of unpaid bills and issues in the claims/encounter process. The Void button on CIMOR billing screen has only recently been enabled, but it appears the actual back end process to void the claim/encounter in the MMIS system will not be functional until mid-late September 2007. Unfortunately, the MMIS system will not allow a re-bill (recognized as a duplicate) through the system until the previous incorrect bill is voided and cleared from the system. The timing for completing the full void process takes a minimum of two payment cycles through Medicaid system (cycles are run every two weeks); thus cutting down the actual time available for completing end of year submissions in a timely manner. All FY' 2006 claims must be submitted

to Medicaid by the current cutoff date in early October. Providers are concerned that they will not get all outstanding claims voided and re-billed in the MMIS within the Medicaid timely filing limit.

4.4 Current Status of Billings

While the current billing process for ADA providers appears to be largely operational within CIMOR, there are a series of issues that affect the amount of effort required by the providers to bill and for CIMOR to accept and process these bills in a timely manner.

Issues identified during the provider interviews include:

- Medicaid has a 12-month timely filing limit, whereby the provider has 12 months from the service date to submit a claim for payment. A one-month extension granted to providers by DMH in which to submit all outstanding claims for FY 2006 appears to be insufficient to get voids/re-bills through the Medicaid system; providers will submit a large number of outstanding claims within a few days time to complete end-of-year processing.
- Enabling ADA Business Rules; CIMOR included front end edits (business rules), some of which were disabled in early 2007. Recently some of those rules were inadvertently reactivated for several days without notice to the providers. This caused an upsurge in claims rejects for at most one week.
- Non-working void button (backend to MMIS not yet functional, but with re-bill process dependent on void), rejected claims/invoices must be reentered (doesn't save prior information), etc.

Numerous system issues, a short time frame, and the introduction of new billing requirements right before the end of the fiscal year billings created huge pressure on providers, who were already behind in revenues because of the CIMOR implementation. DMH requires providers to submit all claims/encounters in CIMOR, and there is no alternate way to submit claims other than to wait for the CIMOR void and re-bill process to function. The providers are concerned that the year-end volume of claims may overload CIMOR as they try to get their billing backlog in on time. The CIMOR system has not been adequately load tested because of the lack of sufficient amounts of data. The volume of claims backlog was not specifically quantified by providers during the interviews but was reported to be substantial (hundreds of thousands of dollars). The Department advised FOX consultants that substantial payments were made outside the system to offset any provider loss; however, the providers remain unable to reconcile payments to individual claims and the perception by both providers and DMH personnel is that the providers have and will experience a loss of revenue from the conversion to CIMOR.

4.4.1 Claims Processing Outcomes

4.4.1.1 Timeliness

Claims processing timeliness appears to be adequate for the claims that make it past all the edits and business rules and into the appropriate system for processing (see issues outlined in the section above). At present, claims are processed every two weeks for both the Medicaid

claims/encounters and for claims/encounters processed through the General Revenue system. No issues were raised in the interviews about this aspect of claims processing.

4.4.1.2 Throughput

Claims submission and processing in CIMOR requires the bills/claims/encounters to pass through a number of systems/interfaces for several reasons: 1) to meet HIPAA standard transactions requirements, 2) to convert billings into a format that can be processed through the state accounting system, SAM II, 3) to allow DMH to receive OHCDS payments for some Medicaid claims, and 4) to capture all billing information in the CIMOR data warehouse.

Encounters that are determined by CIMOR to be payable through Medicaid, for example, have the most complex and lengthy process. They are first run through translation and conversion as part of CIMOR, and then routed to the Medicaid system for processing. The Medicaid remittance advice X12N 835 is routed back through CIMOR, the OHCDS process is applied, an invoice is created, then again translated and converted to a non-standard format for processing in SAM II, before the payment is actually made. The payment process is complex, requires several conversions to and from standard formats at various points in the process before payment is actually made.

4.4.1.3 Reconciliation of Billed to Paid Claims

Currently providers are unable to get good information via CIMOR to compare billed to paid claims, as in some cases where there is no way to track across the various systems involved in claims/encounter processing. Enrolled Medicaid providers are able to view claims submitted by CIMOR via eMomed web portal. However, the payment information for Medicaid claims displayed through eMomed is filed under DMH provider number and includes the OHCDS payment. There is not a one-on-one match to Medicaid payments returned to providers through DMH. Enrolled Medicaid providers are unable to correct Medicaid claim edits directly in eMomed but rather must submit a void and re-billed claim through CIMOR. This further delays provider processing and payments for Medicaid claims.

4.5 Provider Capabilities to Generate and Receive HIPAA Transactions

CIMOR is set up to convert the claims/encounters directly entered into the system to the HIPAA standard claim transaction, the X12N 837P, thereby achieving compliance for providers that only bill using CIMOR. CIMOR conducts the HIPAA conversion in both directions, both into the HIPAA standard X12N 837P upon submission of a claim/encounter from a provider and into an X12N 835 upon payment. This provides an advantage to smaller providers who may have been unable to make the conversion internally. With CIMOR, providers that do not bill payers other than DMH and Medicaid only need to learn and use the system to achieve HIPAA compliance. They would not necessarily (depending on their system capabilities and use) have to adapt their own systems to send claims/encounters, receive remittance advices, or use claim/encounter information.

The larger CPS outpatient clinics and ADA providers have systems capable of generating and submitting claims directly to any payer in a HIPAA compliant X12N 837P and receiving the standard 997 and X12N 835 transactions.

CIMOR does not have the capability to receive and send an X12N 270/271 Claims Status Inquiry transaction at this time.

5 Technical Review of Hardware Architecture

The CIMOR system is a three-tier (3-tier), web-based application written in C# (pronounced “see sharp”) that serves internal DMH staff and external contractors. CISCO network equipment is used throughout, and each CIMOR server involved runs some version of Windows Server 2003 on IBM hardware. Figure 14 provides a high-level overview how CIMOR is put together.

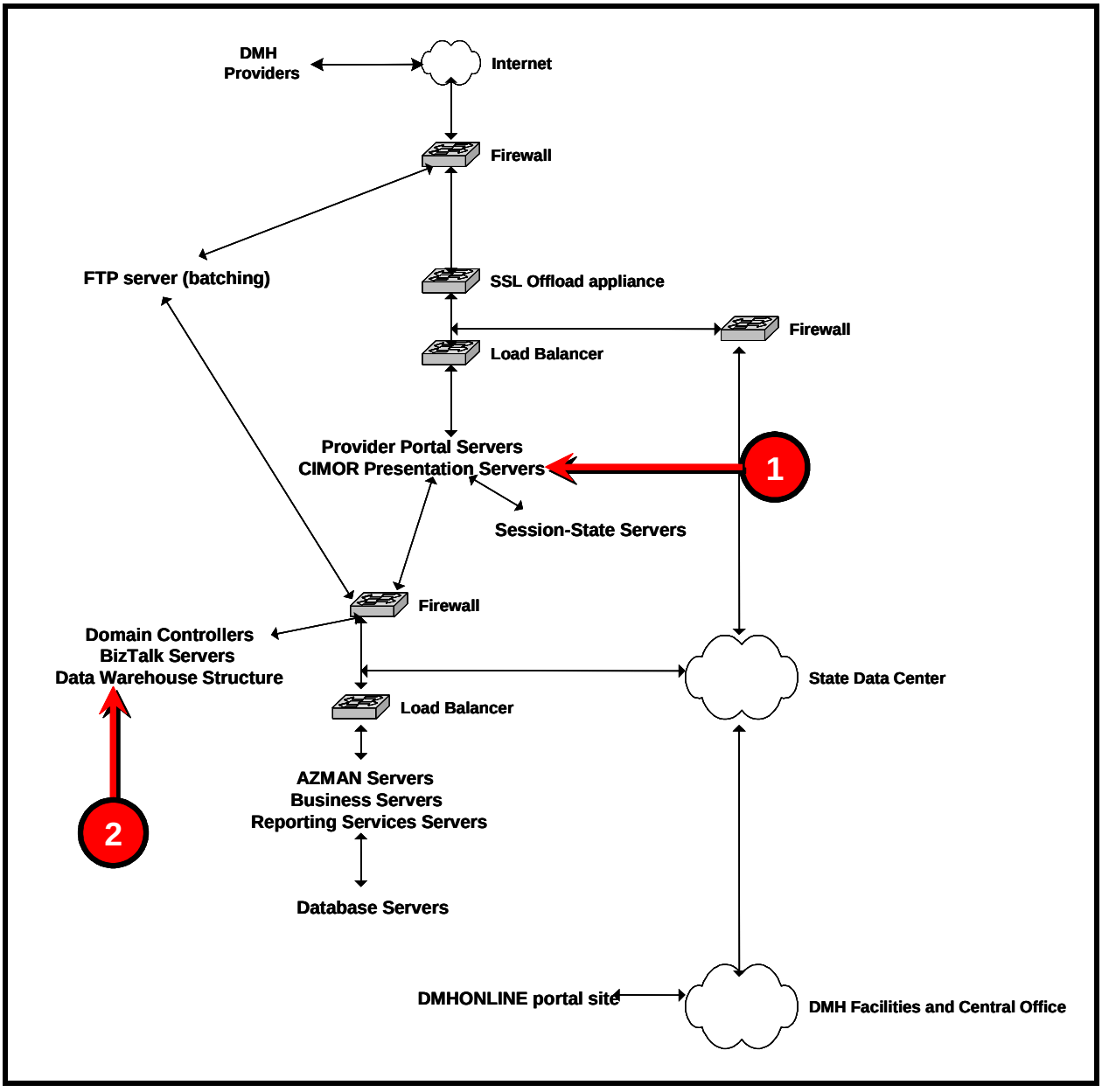


Figure 14 CIMOR Structural High-level Overview 08-18-07

A 3-tier approach is common to developing a web enabled system similar to CIMOR. While there does not appear to be a universally recognized and accepted approach, the 3-tier appears to be the most frequent approach for web enabled applications.

The top of Figure 14 shows DMH providers and the Internet "cloud." The term "cloud" is used to indicate that while there are communications transmission lines such as digital subscriber line (DSL) or telephone land lines, they are too numerous and the interconnections are too complex to follow. Suppose you could enter a cloud in the sky, and further suppose you could walk through it. While walking through the cloud in the sky, you would be unable to find and follow each of the tiny water droplets that comprise the cloud. They are there, but they are too numerous and the interconnections are too complex to follow.

The approximately 2,500 DMH providers outside the State network (i.e., external users) may access CIMOR using either a web browser such as Windows Internet Explorer or by batching transactions (e.g., claims). They use whatever connectivity they have available such as DSL or a telephone land line to connect to the Internet (i.e., the Internet cloud in Figure 14). Next, the Internet automatically makes a connection to the State's 100 Mb Internet presence shown as the down arrow leaving the Internet cloud. These DMH providers next pass through a firewall, which protects the CIMOR network from Internet malware and hackers.

Because CIMOR information is and must remain confidential, Secure Sockets Layer (SSL) is used as the standard process used to encrypt data sent over the Internet. Because the provider data is encrypted when sent to CIMOR (as well as the data sent by CIMOR to the providers), a SSL offload appliance (i.e., a special type of computer) is used to decode / encode the data rapidly.

Once the providers' online data (i.e., real-time transactions) is decoded, it then passes to the load balancer. Because CIMOR has several presentation servers, each server could be busy or idle. The load balancer tries to ensure that all the presentation servers are kept uniformly busy and none are idle.

Both the providers' online data and batch data pass through a second firewall. This second firewall is for added protection to ensure that CIMOR data is effectively isolated from malware and hacking. In essence this is another line of defense. In addition, since encrypting can camouflage some malware, the second firewall prevents any malware encrypted and hidden in provider claims from attacking CIMOR. This second firewall routes transactions either to the CIMOR data warehouse or to CIMOR itself.

Looking at the bottom right of Figure 14 finds CIMOR internal DMH users. About 3,000 DMH personnel (i.e., internal users) connect to CIMOR from either a State facility or from the Department's central office in Jefferson City. Just as DMH providers, these internal users connect to CIMOR using a web browser. Remote DMH facility staffs connect at varying speeds to the Department's central office using the internal Wide Area Network (WAN). A connection is then automatically made to the CIMOR network using the state's gigabit Metropolitan Area Network (MAN) connection (i.e., the State Data Center (SDC) cloud). Finally internal users pass through a dedicated firewall and connect to the load balancer.

5.1 Description of Current Hardware Platform

Figure 15 provides a list of both the CIMOR hardware and software currently in place in Figure 14. For example, the #1 red circle in Figure 14 locates the eight (8) "CIMOR Presentation Servers." The corresponding hardware in Figure 15 is also indicated by the #1 red

circle. As another example, the indicator #2 in Figure 14 points to the “Data Warehouse” while the corresponding hardware is found with the #2 in Figure 15 as the “EDW Database Server” where EDW abbreviates Enterprise Data Warehouse.

CIMOR HARDWARE AND SOFTWARE

Function	Make	Model	Operating System	Quantity	Processor Speed	Processor Count	Memory	Disk Capacity	RAID Config	UPS Capabilities	
CIMOR Presentation Servers (1)	IBM	HS20 Blade	W2K3 Web	8	3.2 GHz	1	2 GB	36 GB	1	SDC	Front-end
Provider Portal Servers	IBM	HS20 Blade	W2K3 Web	2	3.2 GHz	1	2 GB	36 GB	1	SDC	
Session-State Servers	IBM	HS20 Blade	W2K3 Std	2	3.2 GHz	1	2 GB	36 GB	1	SDC	
Domain Controllers	IBM	xSeries 330	W2K3 Std	2	1 GHZ	2	1 GB	18 GB	1	SDC	Management/Authentication
Backup Management Server	IBM	xSeries 345	W2K3 Std	1	3.2 GHz	2	3 GB	108 GB	5	SDC	
IBM Management Server	IBM	xSeries 345	W2K3 Std	1	3.2 GHz	2	3 GB	108 GB	5	SDC	
AZMAN Servers	IBM	HS20 Blade	W2K3 Std	5	3.2 GHz	2	4 GB	36 GB	1	SDC	Authorization
Business Servers	IBM	HS20 Blade	W2K3 Web	2	3.2 GHz	2	2 GB	36 GB +SAN	1	SDC	Business
Database Servers	IBM	xSeries 3950	W2K3 Ent	1	3.3 GHz	8	16 GB	73 GB +SAN	5	SDC	Database
FTP Server (Staging)	IBM	HS20 Blade	W2K3 Std	1	3.2 GHz	1	2 GB	36 GB +SAN	1	SDC	FTP/BizTalk
FTP Server (SFTP Server)	IBM	HS20 Blade	W2K3 Std	1	3.2 GHz	1	2 GB	36 GB	1	SDC	
BizTalk Servers	IBM	HS20 Blade	W2K3 Std	6	3.2 GHz	2	4 GB	36 GB	1	SDC	
BizTalk SQL Servers	IBM	xSeries 366	W2K3 Ent	2	3.2 GHz	4	8 GB	102 GB +SAN	5	SDC	
Message Queue Server	IBM	HS-21 Blade	W2K3 Ent	2	3.0 GHz	4	4 GB	73 GB +SAN	1	SDC	
EDW Database Server (2)	IBM	HS-40 Blade	W2K3 Ent	1	3.0 GHz	4	16 GB	SAN		SDC	Reporting
EDW OLAP Server	IBM	HS-40 Blade	W2K3 Ent	1	3.0 GHz	4	10 GB	SAN		SDC	
Reporting Services Server 1	IBM	HS20 Blade	W2K3 Std	1	3.6 GHz	2	4 GB	73 GB	1	SDC	
Reporting Services Server 2	IBM	HS-40 Blade	W2K3 Std	1	3.6 GHz	2	4 GB	73 GB	1	SDC	

SDC UPS Capabilities:

The SDC is protected by a UPS Liebbert dual module unit with a Central Control Cabinet. Each module is rated at 300 KVA with the maintenance bypass breaker rated at 530 KVA. The data center is currently running around 200 KVA so each unit is serving as a redundant module. There is also a surge suppression unit installed before the UPS system.

Figure 15 CIMOR Hardware and Software

Table 8 shows the initial announcement dates for the CIMOR IBM severs. Not all the equipment appears to be available from IBM[35] [36] at this time; at least they are not available at http://www-03.ibm.com/servers/. However, all the servers no longer available from IBM in Table 8 may be purchased from sources other than IBM (e.g., Internet sources).

Table 8 IBM Server Initial Announcement

#	Server	Initial Announcement	Sold direct from IBM	Can still be purchased
1.	HS20 Blade	September, 2002[37]	Yes[38]	Yes
2.	HS21 Blade	June, 2006[39]	Yes	Yes
3.	HS40 Blade	January, 2004[40].	**No**	Yes
4.	xSeries 330	October 2000[41]	**No**[42]	Yes
5.	xSeries 345	July 2002[43]	**No**	Yes
6.	xSeries 366	August 2005[44]	**No**	Yes
7.	xSeries 3950	April 2006[45]	Yes	Yes

At least one of the items in Table 8 is actively being clearanced by IBM such as the BladeCenter HS20. On the surface this might appear to be a problem. Considering that a life cycle of 18 to 24 months is typical of computer hardware before an upgrade is announced, seeing IBM phase out the equipment is neither surprising nor is it a concern. The IBM server series certainly offers an upgrade path by adding more blades.

[35] Clearance corner, http://www-132.ibm.com/webapp/wcs/stores/servlet/PromotionDisplay?promoName=555218&storeId=1&catalogId=-840&langId=-1.

[36] Our apologies...There is no product available in this category at this time, http://www-132.ibm.com/webapp/wcs/stores/servlet/CategoryDisplay?storeId=1&catalogId=-840&langId=-1&categoryId=4611686018425093853.

[37] IBM eserver BladeCenter and BladeCenter HS20 — The Future of Blade-Thin, Application Servers Is Ready for Your Enterprise, http://www.costcentral.com/pdf/DS/IBMSVO/DSIBMSVO109383.PDF.

[38] Clearance corner IBM BladeCenter HS20 server (79813FU), http://www-132.ibm.com/webapp/wcs/stores/servlet/PromotionDisplay?promoId=1774895444&catalogId=-840&storeId=1&langId=-1.

[39] IBM BladeCenter HS21 blades offer optimum performance efficiency with dual core processor performance, http://www-01.ibm.com/common/ssi/rep_ca/0/897/ENUS106-470/ENUS106-470.PDF.

[40] New Ultra-Slim IBM Blade Is Smallest 4-Way Server Ever, http://www-03.ibm.com/press/us/en/pressrelease/6547.wss.

[41] IBM Highlights, 2000-2006, p. 5, http://www-03.ibm.com/ibm/history/documents/pdf/2000-2006.pdf.

[42] Clearance corner IBM xSeries 336 server (883725U), http://www-132.ibm.com/webapp/wcs/stores/servlet/PromotionDisplay?promoId=1774898444&catalogId=-840&storeId=1&langId=-1.

[43] IBM Highlights, 2000-2006, p. 23, http://www-03.ibm.com/ibm/history/documents/pdf/2000-2006.pdf.

[44] IBM xSeries 366 Express models feature the third generation of Enterprise X-Architecture, http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ca&infotype=an&appname=iSource&supplier=897&letternum=ENUS105-300.

[45] IBM Highlights, 2000-2006, p. 66, http://www-03.ibm.com/ibm/history/documents/pdf/2000-2006.pdf.

The fact that IBM appears to have discontinued some of the referenced CIMOR equipment could be an issue if support is dropped. However, ITSD does have an IBM maintenance contract to provide maintenance and parts for all its CIMOR equipment.

ITSD also has an ongoing formal equipment replacement program using a five year cycle. Equipment duty capability, application demands, and maintenance contract costs are monitored. Because the maintenance contract for discontinued equipment escalates each year and because application demands may also increase, ITSD ensures that the most cost-effective solution is pursued in either retaining and maintaining discontinued equipment or purchasing new equipment. The monitoring process is performed in a timely enough manner to allow equipment budget request preparation and submission.

The processors and memory shown in Figure 15 appear to be consistent with the IBM computer models and operating systems shown. The operating systems are addressed in Section 6.

Comparatively speaking, all the server equipment, except the xSeries 3950 model for SQL Server, is at the lower end of the server spectrum meaning that all the equipment has substantial room for growth. For example, the IBM System Cluster 1350 using HS21 blade servers (or others) is a growth option.[46] The IBM System Cluster 1350 has the capacity for 1,024 managed nodes using the BladeCenter HS21.[47]

CIMOR disk space is assumed to have been sized adequately based on expected demand load. To ensure adequate space, ITSD monitors performance to ensure reasonably enhanced performance.

Redundant Array of Independent Disks (RAID) configurations offer the opportunity to improve overall data management reliability and speed. This is logically accomplished (but not necessarily physically accomplished) by duplicating the data.

Regarding reliability, one way to view RAID is to consider an automobile insurance policy. People have car insurance so that in the event the car is in a wreck the auto may be repaired or replaced. Thus, auto “duplication” is provided via the insurance policy. The policy is neither in the same place nor the same size as the car. But the policy could repair or replace the auto if a wreck occurred.

Regarding speed, one way to view RAID is to consider a newly opened multi-lane toll road that just replaced an old two lane toll road which is still open. Suppose the new toll road has 12 lanes or 6 in each direction. Further suppose each toll road has one toll booth per traffic lane. The toll booths control the traffic flow into and from the roads. Assume both roads have a 60 mph speed limit. Both roads have one booth per lane; both roads have a 60 mph speed limit. So which road would have a higher traffic count during the rush hour? The obvious answer is the new toll road. The reason is the new toll road can have six (6) cars going in each direction in parallel (i.e., at the same time).

RAID configurations work the same way for data as insurance policies and toll roads work for automobiles. Special computations are performed on the data to generate an additional piece of information that acts as an insurance policy for the data (i.e., repair or replace the data). In

[46] This is neither an endorsement nor recommendation to move to cluster servers. Likewise it is neither an endorsement nor recommendation to use IBM systems.

[47] IBM System Cluster 1350 Facts and Features, p. 5, ftp://ftp.software.ibm.com/common/ssi/pm/br/n/clb03001usen/CLB03001USEN.PDF.

addition the data is split into blocks and the blocks are written to multiple disk drives operating in parallel. That is, data is flowing onto and from the disk drives in parallel. Just like more cars can pass during the rush hour on the toll road, more data blocks can be read / written at the same time using RAID.

The RAID 1 configuration in Figure 15 provides both reliability and speed by making an exact duplicate (i.e., a mirror copy) of the data on a second disk drive. This in essence provides both reliability and speed. Reliability is possible because two copies of the data exist. Speed is possible because the data can be read from either drive at the same time. A RAID 1 configuration has high disk overhead due to the duplication of write operations. If the RAID operations are controlled by software as opposed to hardware, "hot swapping" of disk drives may not be possible.

The RAID 5 configuration in Figure 15 provides both reliability and speed. The reliability is provided by a process that creates entities called "parity blocks." A parity block is analogous to an insurance policy on a fleet of cars. Just as several cars would have one insurance policy to repair or replace the autos, a data block has one parity bit that helps to ensure that data integrity is maintained. If something happens to the data, the parity bit is used to reconstruct the damaged data. However, in the event of a disk drive failure, rebuilding the lost data may be quite difficult.

Storage Area Network (SAN) is also identified in Figure 15. The ITSD SAN uses a RAID 5 configuration. In addition a spare drive is available for every eight (8) SAN drives. In the event of a failure the data is cached in the controller and the spare drive automatically brought online.

Primary CIMOR production and data warehouse operations are at the Harry S Truman Building at 301 West High Street in Jefferson City. System backup / restore capabilities and processes are maintained there. ITSD is currently converting from Veritas NetBackup Data Center 6.0 to Tivoli Storage Manager (TSM) 5.3 Level 4 as their backup/restore software. In addition to normal data file backup, ITSD also has Microsoft SQL database backup capability. Backups are currently performed 7 days a week during the overnight hours. Each data backup is retained for a period of 14 days. As a service, the SDC handles archiving, background processing, and making tape copies of the CIMOR data for their offsite storage location at the Missouri Secretary of State's data vault.

The SDC's electrical power is protected by an uninterruptible power supply (UPS) Liebbert dual module unit with a Central Control Cabinet. Each module is rated at 300 KVA with the maintenance bypass breaker rated at 530 KVA. The data center is currently running around 200 KVA so each unit is serving as a redundant module. There is also a surge suppression unit installed before the UPS system.

ITSD personnel at the Truman Building and Central Office participate in cross training to ensure that each could provide support to the other in the event operations personnel were unavailable for some extended period of time. ITSD states that they conduct yearly disaster recovery exercises.

ITSD states that redundancy was built into most of the hardware architecture as a best practice. They claim that only a few high-cost switches are single points of failure. Further spare blade servers are available in the CIMOR racks and ready to be immediately swapped in the event of a blade failure.

In the event of a limited disaster (e.g., building destroyed by fire) and the primary operations center becomes unavailable, ITSD would restore operations to the Central Office at 1706 E. Elm

St., Jefferson City where the hardware for the CIMOR training and test systems is located. This equipment would provide a "warm site" backup according to ITSD.

Unfortunately, in the event of a catastrophe such as a terrorist attack on the scale of 911 or Katrina that rendered both the SDC and Central Office inoperable, CIMOR has no operational backup. However, discussions and planning are ongoing for an operational backup SDC in St. Louis, MO or another geographically remote location in the next 12 to 24 months.

In general, ITSD has taken reasonable steps to provide effective hardware solutions for CIMOR. Further, within the limitations of no SDC backup site, ITSD has taken reasonable steps to ensure continuous CIMOR operations.

5.2 Description of Network Capabilities

Figure 17 is a blowup of the DMH cloud at the bottom right of Figure 14. Figure 17 accommodates about 3,000 DMH personnel. CISCO network equipment is used throughout the network in both Figure 14 and Figure 17.

As Figure 17 shows, the CIMOR network is nontrivial so no attempt was made to inventory the CISCO network equipment. Consequently, the report focuses on CISCO being recognized as a networking leader.

CISCO has been recognized as providing outstanding technical assistance to its customers.[48] NetworkWorld reports "Cisco's devices were more efficient, relative to their competitors, at reducing WAN bandwidth consumption…"[49] NetworkWorld also ranks CISCO as one of the top technical leaders in the following categories:[50]

- Superior leadership qualities #2
- Key technology leader #1
- Superior technology vision #3
- Superior executive management #3
- Strategic supplier #1
- Buying intentions #2

CIO Insight ranks CISCO #3 overall in its list of telecommunications vendors.[51]

In general CISCO is a recognized industry leader, and ITSD's use of CISCO equipment appears to be an excellent decision.

During the interviews, several respondents, especially the providers, expressed concerns about CIMOR's network to support new providers as the other two DMH divisions were added to CIMOR.

[48] 2006 Channel Champions - IBM, Cisco Champions Of Champs, http://www.crn.com/it-channel/185301125.

[49] "Application acceleration: Making Windows go fast," NetworkWorld, August 13, 2007, pp. 44 – 54.

[50] "Top tech leaders," NetworkWorld, November 11, 2006, pp. 34 & 6.

[51] The Pursuit of the Perfect Platform - Trend 30: (Some) Vendors Try Harder, http://www.cioinsight.com/article2/0,1540,1909366,00.asp.

ITSD has some limited capability to monitor its network traffic. Figure 16, which is seven (7) days of actual network usage, provides an example of the type of monitoring possible. The green peaks show burst traffic while the blue lines show average usage. ITSD states that the network rate-limit is calculated by taking the average usage of the connection and multiplying by 200% which should give room for growth and burst traffic. This process appears to be consistent with Figure 16 since the green peaks appear to be twice the average load.

Using information similar to that shown in Figure 16, ITSD calculates DMH's average usage at or about 1 Mb, which therefore estimates a burst rate of about 2 Mb/sec. Thus, ITSD should have 2Mb/sec available at all times.

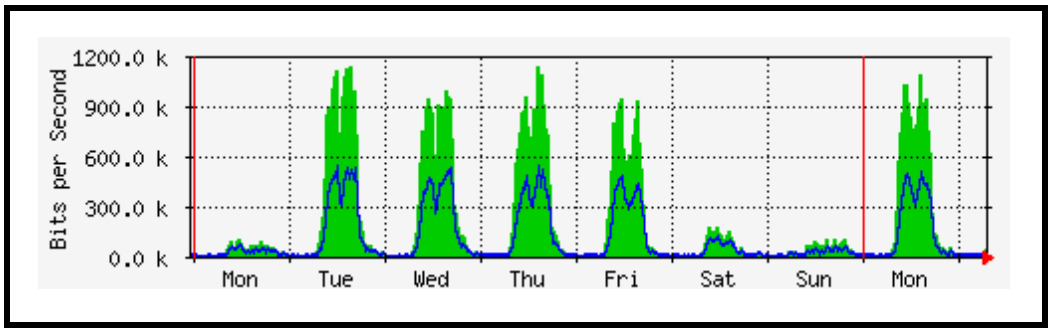


Figure 16 DMH Network Usages Over a Typical Seven Day Period

The SDC in Figure 14 manages all State telecommunications lines. As part of this management process ITSD is provided a dedicated link that handles applications sensitive to latency such as VPN, videoconferencing and, in DMH's case its CIMOR SSL application. This link is called a "high-sensitivity" link and is currently set at 27Mb. However, much higher line speeds (e.g., 100 Mb or 1,000 Mb) from the State are available if needed.

The current 1 Mb is approximately 4% of the 27 Mb "high-sensitivity" link. At present ITSD estimates that approximately 500 providers are actively using CIMOR. ITSD estimates that when all DMH divisions' providers are active on CIMOR that about 2,500 users will be using the system. Assuming a linear relationship, these 2,500 providers would use approximately 5 Mb under an average load and around 10 Mb (10 = 5*200%) of burst capacity. This 10 Mb represents approximately 19% of the 27 Mb line. Even at peak loading only about 19% of the line capacity would be used.

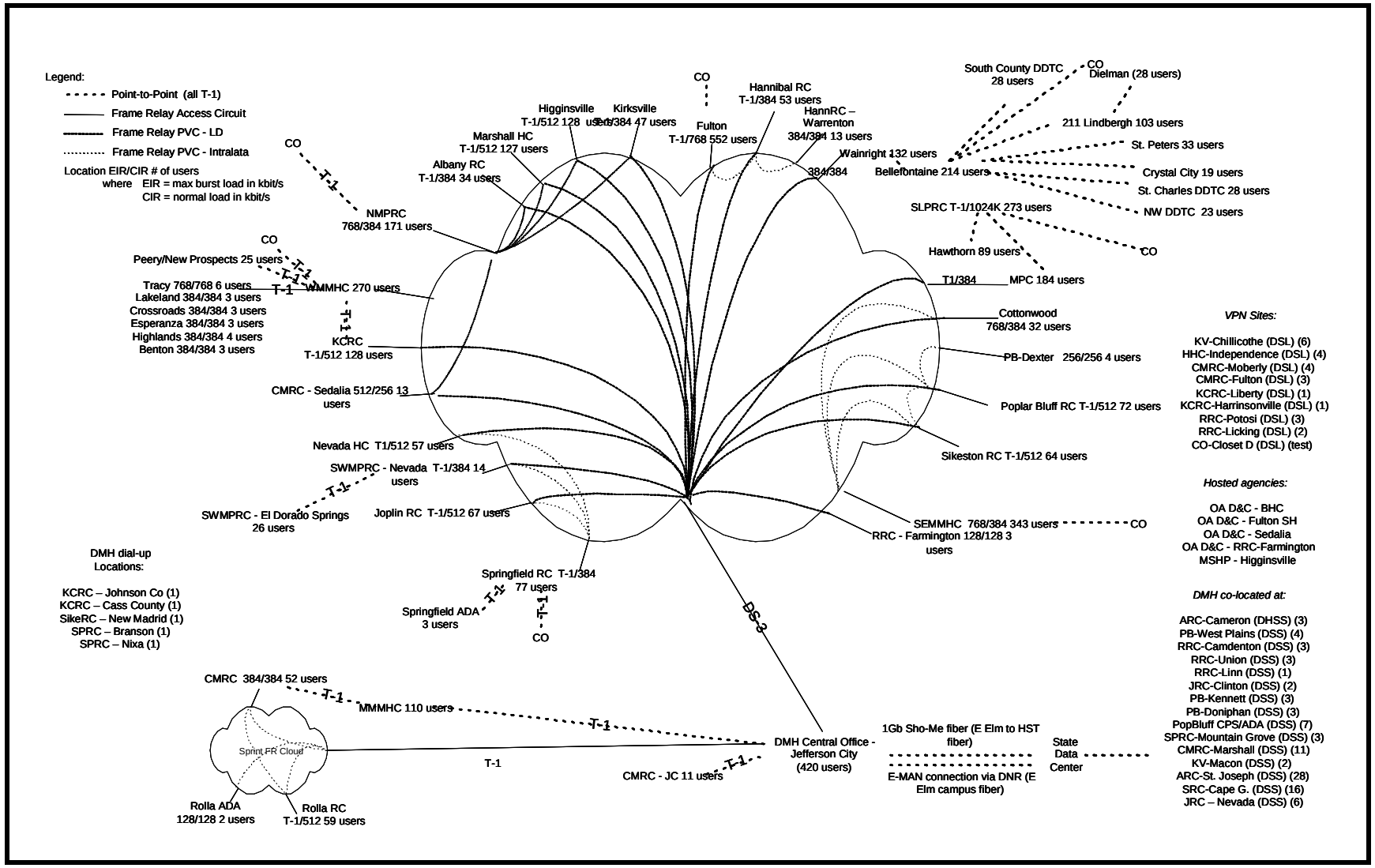


Figure 17 DMH Wide Area Network

Before one can say unequivocally that increasing the number of provider users would not pose a problem, the SDC must make capacity available before it is needed. However, based on ITSD's measurements sufficient capacity appears to be available currently.

5.3 Detail Description of Hardware Issues

As already stated, CIMOR works today. This mere fact alone indicates that the current CIMOR is adequate to run today's application load.

However, significant concern exists regarding ITSD's inability to size future hardware needs based on objective, quantifiable data. ITSD at present has no way to measure end user response time. However, ITSD has stated that they are in the process of actively investigating software tools to do this.

Significant concern exists regarding ITSD's currently having no way to artificially load and stress its network and CIMOR hardware. ITSD optimistically believes that it currently has sufficient network and hardware capacity to accommodate all three DMH division providers. It may. It may not. There is no objective, quantifiable way to tell.

These two issues should be resolved.

As stated previously in the event of a catastrophe eliminating both the SDC and Central Office, CIMOR ceases to exist. A solution to this is being explored with resolution possible in the next 12 to 24 months.

6 Technical Review of Software Architecture

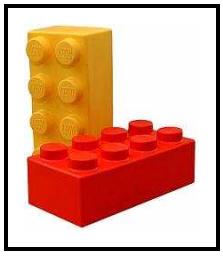


Figure 19 Lego Blocks
(www.freshread.com/arimg/LEGO.JPG)

In 2001, ITSD elected to use Microsoft .NET architecture for developing CIMOR. This was quite an insightful decision. In fact, ITSD is to be applauded for this decision.

Microsoft .NET in some ways is much like Lego blocks. Lego blocks come in different sizes, shapes, and colors. They are simple structures that can be combined to form objects limited only by imagination.

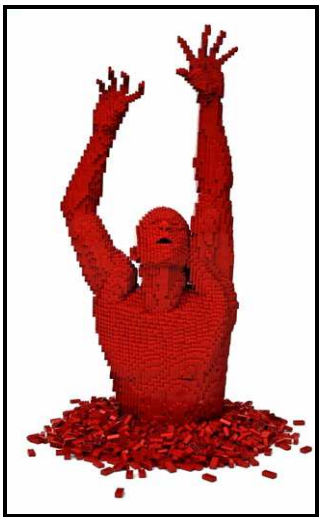


Figure 18 Sawaya Created "Red" Using Lego Blocks
(http://www.cnn.com/interactive/entertainment/0705/gallery.lego.art/frameset.exclude.html)

Microsoft .NET provides the building blocks and connections for interconnecting systems, information, and devices through Web services, which are small, reusable programs that allow computers to talk to each other even if the computers do not have the same Microsoft Windows operating system (i.e., Windows Vista, Windows Server 2003, and Windows XP).[52] These small, reusable applications are just like Lego blocks. These web services are then put together to allow both people and computers to work more effectively together. The .NET technology is an integral feature of new Microsoft products.

Microsoft claims that .NET technology allows one to quickly develop applications and implement them. They also claim that .NET benefits everyone: individual users, organizations, and developers.[53]

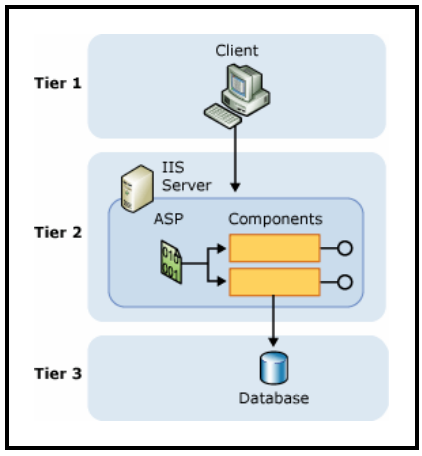


Figure 20 A 3-Tier Applications
(http://msdn2.microsoft.com/en-us/library/ms524900.aspx)

CIMOR was developed as a 3-tier architecture system. Another term for tier is layer so the first tier or layer is the one that the end user sees. An example of a 3-tier application is shown in Figure 20. Tier 1 is called the presentation layer. Tier 2 or layer 2 is called the business logic layer. Finally Tier 3 is called the data services layer. Sometimes a 4-tier architecture is used, in which case Tier 3 would be named the data access layer, and Tier 4 would be the database layer.

The three layers or tiers in CIMOR are clearly shown in Figure 21. The first tier (i.e., Tier 1 in blue) is the data presentation layer, which provides the graphical users interface (GUI) to the end user (i.e., it is what the users sees on his/her computer screen). Tier 2 in yellow is the business logic layer in which business functions are executed (e.g., claims processing). Finally Tier 3 is the database layer (or data services) in which DMH's data resides.

[52] .NET Framework 3.0 Versioning and Deployment Q&A, http://msdn2.microsoft.com/en-us/netframework/aa663314.aspx.

[53] Microsoft .NET Frequently Asked Questions, http://www.microsoft.com/net/basics_faq.mspx.

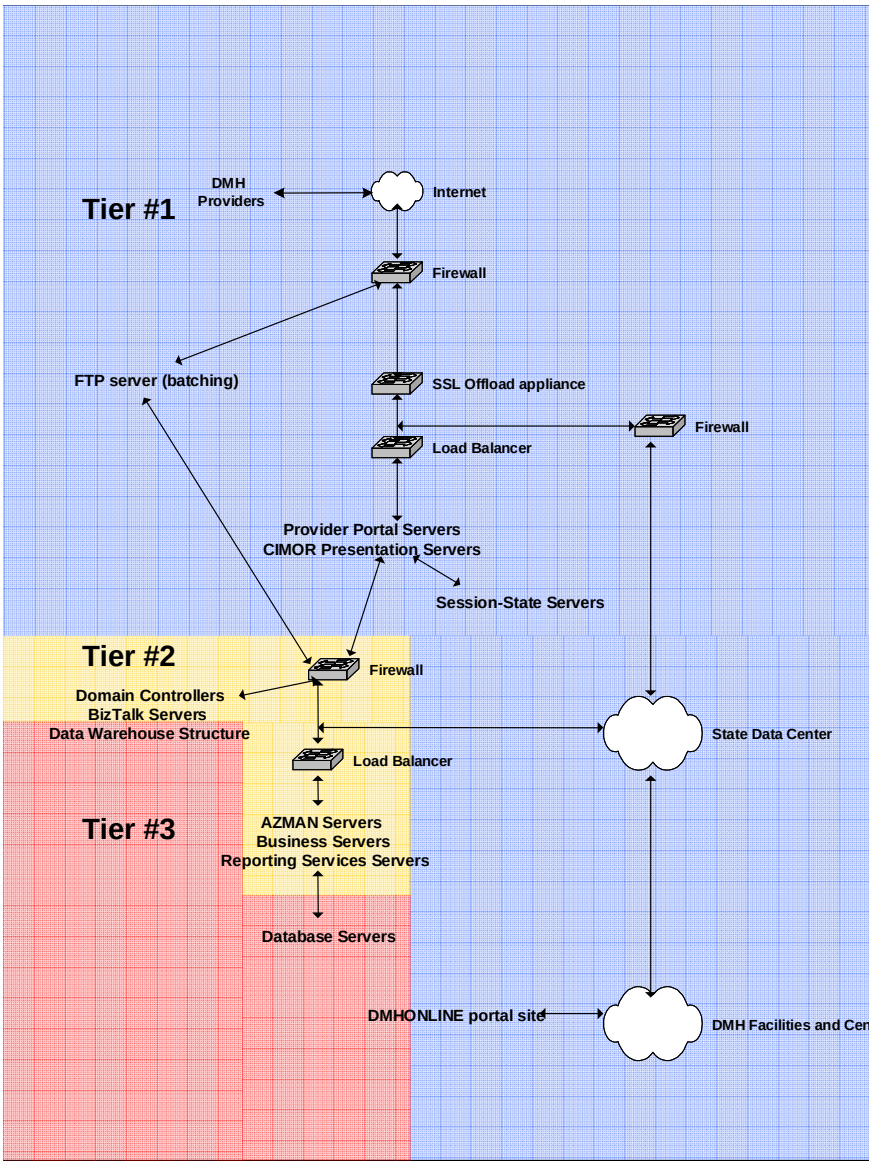


Figure 21 CIMOR is a 3-Tier Application

The 3-tier architecture isolates each major piece of functionality, so that the presentation (i.e., GUI) is independent of the processing rules and business logic, which in turn is separate from the data. Microsoft states that this model requires much more analysis and design up front, but greatly reduces maintenance costs and increases functional flexibility in the long run.[54]

[54] Designing Multi-Tier IIS Applications, http://msdn2.microsoft.com/en-us/library/ms524900.aspx.

6.1 Description of CIMOR Software and Applications

Without software CIMOR does not exist. Consequently this section discusses CIMOR's software, which is split into two major software categories:

- System
- Application development

For the purposes of this report both Microsoft Windows 2003 Server and Microsoft SQL Server 2000 are classified as system software, while C# is classified as application development software.

As observed in Figure 15, CIMOR uses the following two system software components:

- Microsoft Windows 2003 Server
- Microsoft SQL Server 2000

Windows 2003 Server has multiple versions or editions, some of which are shown in Figure 15 and described here:

- **Standard Edition –** Targets departmental work areas providing services such as printing, file sharing, and Internet access
- **Enterprise Edition –** Targets the organization for its mission-critical workloads such as business applications (e.g., inventory, vehicle maintenance, etc.), Web services (e.g., Internet sales, email, etc.), and infrastructure (e.g., security, device management, etc.)
- **Web Edition –** Targets dedicated Web serving and hosting and is a key part of the .NET Framework.

Note that the "Quantity" column in Figure 15 not only indicates the number of computers (e.g., IBM HS20 Blade), but also shows the number of operating systems since each server must have an operating system.

Microsoft introduced Windows Server 2003 operating systems in 2002 as a replacement for its Windows 2000 server operating system. In the 1990s and early 2000s Windows operating systems reliability and security capabilities were being targeted by hackers and criticized by users and the media. The new Windows Server 2003 operating systems introduced had improved reliability (and therefore availability) and security. With computer power rapidly increasing and disk storage demands hitting and exceeding terabyte (i.e., one trillion characters) ranges, the need to be able scale solutions became critical. That is, business had to be able to handle its entire business needs and not jut part of them. Thus, over time Windows Server 2003 became dramatically scalable to handle extremely large and demanding information tasks. Scalability is further discussed in Section 6.3.

In 2000 Microsoft announced its Microsoft SQL Server 2000, which is a relational database management system. A relational database is a file with tables in it. These tables would look much like an Excel spreadsheet. In general each table is related to one or more tables. The relationship could be by the contents of any column in the table. For example, an employee name table might have a column of names and a second column of social security numbers. Another table might have W-2 tax information. One of the columns in the tax table might be social security numbers. Because both tables have social security numbers, the two tables are

related by those numbers. Thus, the names would not have to be in the tax table. They could be looked up by using the social security numbers in the employee name table. Microsoft SQL Server 2000 manages these types of tables and the databases that contain them.

End users could use query tools such as SAS, Excel, Access, etc. to pull information from the tables on the SQL server to their computers for further analysis and reporting.

In general the SQL server would have a large number of tables to manage. In fact often individual databases are created to address a single function such as financial information or inventory. Thus the server would have to manage not only the databases but also the tables inside each database. Because this becomes a great deal of work even for a computer, Microsoft SQL Server 2000 has tools performing maintenance on the individual databases and their tables.

Microsoft SQL Server 2000 is designed to help many users perform queries against the databases. Because these queries may apply to several large tables at one time, SQL Server 2000 also provides tools for monitoring activity and optimizing database performance so that queries run faster.

Because databases are usually large and because people never seem to be satisfied with the data they have, additional data is always be added to existing databases. Sometimes this means that two or more databases must actually be merged. Microsoft SQL Server 2000 provides for tools for importing and exporting data efficiently.

CIMOR applications development has been performed using C# .NET, which is a component of Microsoft Visual Studio .NET. Visual Studio provides Rapid Application Development (RAD) programming capabilities.[55] RAD is the term used in software lifecycle development for quickly, efficiently, and effectively developing program code while focusing on the business problem as opposed to programming intricacies. Visual Studio has a comprehensive set of programming tools for .NET web applications including the programming languages Visual Basic, Visual C++, Visual C#, and Visual J#.

C# .NET has the ability to extend the functionality of Microsoft Word and Microsoft Excel via writing programs for them. As clearly indicated by the .NET, C# can utilize the functionality available in .NET. C# .NET has the functionality built in to support mobile Web devices including mobile phones, pagers, and personal digital assistants (PDAs). There are various programmer aids that help improve programmer productivity (e.g., anticipating certain language functions and automatically supplying them). It also has the capability to use and debug SQL applications as well as to visually design tables and queries.

6.2 CIMOR Applications Capability to Meet Current Needs of Business Users

The fact that .NET is the foundation for CIMOR is extremely fortuitous. CIMOR with its current software level capabilities has more than enough capacity and ability to meet any current need (e.g., those identified during the interviews such as medical records, physician orders via PDA, etc.) DMH personnel and its providers could demand. That is not to say that ITSD has already developed the programs to meet these demands: they have not.

[55] Visual Studio .NET: "Essential Enabler" of New World of Web Services, Applications, http://www.microsoft.com/presspass/features/2002/feb02/02-08vsnet.mspx.

6.3 CIMOR Applications Capability to Support Future Business Needs and Goals

It would be more nearly accurate to say that existing DMH business needs are the planned enhancements for CIMOR. The entire set of planned CIMOR enhancements can and may be met with the existing software foundation.

However, to move toward meeting the 5- and 10-year vision for DMH requires strategic planning for CIMOR. This has not yet been done. Regardless, to position DMH to be Missouri's "Mental Health Authority" will require CIMOR to be much more of a decision support engine and data mining warehouse than currently envisioned. Given that DMH expects to remove itself from the facility management business and become the policy implementing, mental and behavioral healthcare monitoring, and results outcome measuring agent, DMH must have objective, accurate, and quantitative information based support. CIMOR has the potential to be the required support base.

Subject to the caveat that software upgrades are made when and where appropriate, the software architecture ITSD has selected for CIMOR (specifically .NET and SQL Server), possibly augmented with COTS packages, is well positioned to meet DMH's future needs

Two of the issues that the future always seems to hold are more data and more demand. Thus, scalability of hardware and software are a factor that must be considered. What is a possible growth path for CIMOR?

Symmetric Multiprocessing (SMP) is process that uses a combination of computer hardware and software to provide substantial performance improvement by making multiple CPUs available to complete individual processes simultaneously (multiprocessing).[56]

Although the most common SMP hardware systems are 2-way, 4-way, and 8-way, SQL Server 2000 and Windows Server 2003 can run on SMP hardware systems with up to 64 nodes (e.g., computer processor). These systems can have up to 64 gigabytes (GB) of memory with the 32-bit Intel architecture, and up to 4 terabytes of memory with Intel's new 64-bit Itanium architecture. To date, the largest configurations supported by SQL Server 2000 running on Windows Server 2003 are 32 processors with 512 GB of memory. These systems demonstrate excellent SMP scalability, both on audited benchmarks and in real applications. Today, a single CPU can support 14,000 users accessing a 1-terabyte database, an 8-processor node can support more than 92,000 concurrent users accessing a SQL Server managing billions of records on an 8-terabyte disk array, and a 32-CPU node can support 290,000 users accessing a SQL Server database hosted on 24-terabyte disk array. The largest of these servers are capable of processing more than 1 billion business transactions per day.[57]

Scalability in terms of hardware and software is essentially a non-issue for DMH. Scalability in terms of dollars may be an altogether different issue.

[56] This is neither an endorsement nor recommendation to move to SMP. Likewise it is neither an endorsement nor recommendation to use Microsoft products.

[57] SQL Server 2000 and Windows Server 2003: SMP and Clustered Megaservers, http://www.microsoft.com/technet/prodtechnol/sql/2000/plan/ssmsam.mspx#EJD.

6.4 Detail Description of Software Issues

CIMOR's capabilities have much more robustness than end users are using. End users, DMH personnel and providers, are struggling entirely too much. The existing software capabilities should be utilized and maximized to make doing business easier for end users. For example, the data warehouse could have one or more extracts created in a relatively short time period to allow users to access the data they need. ITSD should provide data for users and then allow users to use it. ITSD does not need to be in the query and reporting business other than for production queries and reports.

Historically ITSD has had no tools to monitor and forecast system performance across and internally throughout Figure 14. In particular ITSD has not had the capability to monitor and forecast end user response times. ITSD must have the capability to monitor and forecast system load. This situation should be remedied.

ITSD has had no tools to induce artificial system stress and to do volume testing on CIMOR. This stress and volume testing should include sufficient transactions to break each CIMOR component. For example, the network should be overloaded so that the known break point is monitored and never reached. The production database should be stressed until it fails. Again transaction counts against the database should be monitored to ensure this point is never reached. Without the capabilities to perform these functions ITSD will face challenges in accurately sizing its hardware and knowing when to request additional line capacity from the SDC. ITSD should carefully consider testing CIMOR to ensure that all its components will function adequately before adding the other two divisions to CIMOR.

Timeouts are still occurring in CIMOR. ITSD states that the number is decreasing. While this may be true, no one knows what is causing the timeouts. ITSD believes that the timeouts may be software related. Some performance monitoring and transaction tracking mechanism is needed to isolate where, when, and why the timeouts are occurring so that they problem may accurately identified and resolved. As the saying goes "Plan for the worst and hope for the best." ITSD has acquired the Symantec i3 performance monitoring software tool to address this problem.

Microsoft SQL Server 2005 is now available.[58] Microsoft SQL Server 2008 is announced.[59] ITSD is using Microsoft SQL Server 2000. The CIMOR data warehouse was implemented using Microsoft SQL Server 2005. ITSD plans to migrate CIMOR to SQL Server 2005 in December, 2007. Microsoft Windows Server 2008 is announced.[60] ITSD is using Microsoft Windows Server 2003. The Microsoft Support Lifecycle took affect October 2002.[61] Essentially Microsoft provides five (5) years of support plus another five (5) years for fixes. Thus each package gets about 10 years of support. Microsoft SQL Server 2000 was generally available 11/30/2000.[62] Microsoft has scheduled mainstream support to end 4/8/2008. The next five-year period ends 4/9/2013. Microsoft Windows Server 2003 was generally available starting

[58] Microsoft SQL Server 2005, http://www.microsoft.com/sql/default.mspx.

[59] Microsoft SQL Server 2008, https://connect.microsoft.com/SQLServer/content/content.aspx?ContentID=5395.

[60] Windows Server 2008, http://www.microsoft.com/windowsserver2008/default.mspx.

[61] Microsoft Support Lifecycle, http://support.microsoft.com/default.aspx?scid=fh;en-us;lifecycle&ln=en-us&x=11&y=5.

[62] Microsoft SQL Server 2000 Microsoft Support Lifecycle, http://support.microsoft.com/lifecycle/?LN=en-us&p1=2852&x=13&y=5.

5/28/2003.[63] Consequently, the first five-year period could end in 2008 with the second possibly ending in 2013. The suggestion is made that ITSD carefully monitor its software lifecycle (analogous to its hardware policy) to ensure that it does not stay too long with any one product such that it could adversely affect CIMOR and its operation.

[63] Windows Server 2003 Microsoft Support Lifecycle, http://support.microsoft.com/lifecycle/?p1=3198.

7 Review of Project Management Approach

The review of the approach used by DMH in managing the CIMOR project has been done employing the project management and independent verification and validation experience of FOX staff and using the Project Management Institute's standards as the recognized industry standard for project management. The major findings of this review are:

- Given the resource and budget limitations and major competing IT initiatives (HIPAA, ATR, OHCDS) during the course of implementing CIMOR, the DMH IT department has done a commendable job of managing the implementation of a complex enterprise-wide system replacing several legacy systems using new technology.
- Many project management best practices are used in the CIMOR development but are less formal and structured than needed for a project of this magnitude.
- Since the December 2006 implementation, the project planning employed has not provided a comprehensive and continually updated big picture and overview schedule and work breakdown structure (WBS).
- Since the December 2006 implementation, the DMH IT management has devoted its limited personnel primarily to the direct development and maintenance activities related to making the CIMOR system operational; this has restricted the availability of resources for planning and project management overhead.
- The Business Owner Group and IT Steering Committee are very good practices for helping IT address the correct business needs.
- Because of a lack of planned quality measures there is a big disparity between the IT staff perspective and the end system user perspective of how well CIMOR is meeting the business needs.

7.1 Description of Current Project Management Approach

The State's IT advisory board under the CIO has a project management standing committee that has developed the State of Missouri project guidelines. At present ITSD has a project management methodology for application development outlined within their "Project Management Best Practices." Those ITSD project management standards closely parallel the Project Management Institute (PMI) standards which are recognized as industry standards. The ITSD conducts a State of Missouri project management training curriculum for IT project managers. DMH ITSD's current direction is to build adherence to the Agile development methodology. They are exploring this along with a statewide effort to select a standard development methodology across agencies.

The CIMOR project management has been overseen by a steering committee and more directly managed by an implementation team consisting of the Assistant IT Manager acting as project manager, the IT Director, and three management representatives from the business divisions. For the five years up to July 2006, the CIMOR project there was also a contracted project oversight entity, CIBER, Inc., which conducted monthly process reviews and consultation regarding project management processes.

Now that some of the large components of CIMOR have been made operational the project management process must address the maintenance and operation of those components as well as the construction, testing, and implementation of the remaining CIMOR components.

One group of developers is responsible for performing system enhancements, bug fixes, and new system development including any project plan enhancements associated with the new system development. The development team is comprised of 15 full-time equivalent individuals - 10 State employees and 5 contractors. Two summer interns also work on peripheral development activities but not actual CIMOR code development.

Enhancements are changes to production CIMOR that add functionality. Bugs represent system modifications that specifically address a defect or unintended consequence of code execution (i.e., broken functionality). Project tasks are changes to functions that are to be incorporated into the portions of CIMOR that are have not yet been implemented.

Figure 22 shows the ways that those types of changes are introduced to the system development.

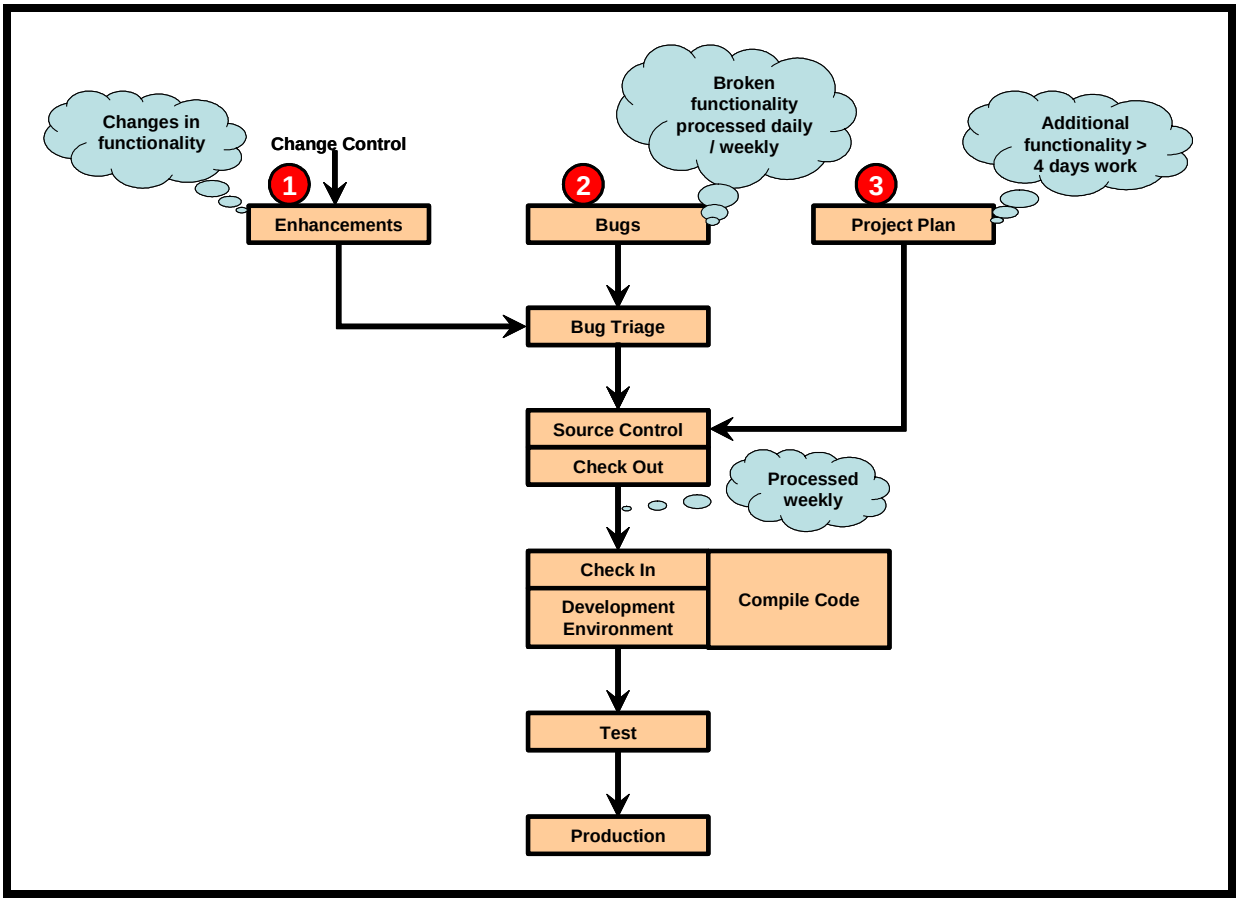


Figure 22 Change Control Process

7.1.1 DMH IT Project Steering Committee

Recently, an ongoing project steering committee has been established to serve as the high-level decision-making body for establishing the priority of any major changes that may impact the CIMOR project as well as all other DMH IT projects. It is made up of executives from each of the operational divisions of the Department. The IT Director and Assistant IT Director serve as advisors. For change requests to the planned new system development, the Steering Committee determines their priority after the Business Owner's Group has agreed upon them.

7.1.2 CIMOR Business Owners Group

The CIMOR Business Owners Group has evolved from what had been known as the Implementation Team earlier in the project. This group consists of management level representatives from each of the program areas of the Department. They are responsible for communicating their business needs to the IT staff, evaluating change requests, and representing the providers and consumer interests in the system development and change process.

CIMOR enhancements and project plan enhancements undergo prioritization by the Business Owners Group and the IT Steering Committee. The Business Owners Group, looking at the tasks from a business priority perspective and using the DMH ITSD recommended priority score, assign DMH business priorities to each enhancement and project plan enhancement. The change request form has six criteria used to determine priority. The IT Steering Committee then reviews the task priorities from an overall DMH strategic business perspective and dictates the final schedule priority. Currently there is a formal change control for the production system through the Business Owner's Group. They plan for a three-month release for major identified high priority enhancements. Bugs and fixes are addressed in an ongoing change control process; there is bug triage weekly using Bug Tracker from help desk email notices.

7.2 Qualifications of Project Managers

Mr. Gary Lyndaker is the IT Director for the Department of Mental Health and is responsible for all the IT human resources for DMH, approximately 150 people, about half of whom are located in the central office and the other half throughout the State. He is responsible for the entire IT infrastructure (email, networks, the 200 – 300 servers, and the AS400 machines) to support the 29 medical facilities and regional facilities as well as CIMOR and over a dozen other central office software applications. The IT Director has reported to different superiors during the time that he has been in that position. He currently reports to the State CIO, and works within DMH reporting to the Deputy Director of Administration. Mr. Lyndaker and all his staff are actually employees of the Office of Administration – Information Technology Services Division (ITSD) which is the State's central IT services support agency.

Ms. Rhonda Haake is the Assistant IT Director for the Department of Mental Health and is the Manager of Software Services. She has managed the CIMOR project since the initial 1998 RFI. She is also responsible for the CIMOR data warehouse, reporting services, IT administrative operations and HR, ITSD web administration, and the project management office.

Both managers have attended and have been certified by the State of Missouri project management training and continuing professional education.

7.3 Project Scope Management

Project scope management is the process of ensuring that the work to design and deliver the desired system functionality is directed toward accomplishing that objective. It involves defining and achieving concurrence with all stakeholders of the boundaries of the project and incorporating changes to that definition as required throughout the course of the project. The initial scope definition of the CIMOR project was outlined within the procurement documents and initial project plans of the contracted entity that was originally planned to completely develop the system. The scope was generally associated with the functionality of the several DMH legacy systems that CIMOR would need to replicate and replace within a single enterprise-wide system. Also, several new functions were included as part of the initial project scope.

During the course of the CIMOR project there have been several major system enhancements or new system developments such as ATR and OHCDS that have been necessary to be developed by the IT department. These required system changes have caused CIMOR development to be slowed or halted for extended periods because the revised functionality had to be incorporated into CIMOR or had to be incorporated into the DMH legacy systems which diverted developer resources away from CIMOR project planning development work. The ATR function, for example was needed for support of ADA's large federal grant.

When any of those required system changes caused a change to planned CIMOR functionality, the scope of the CIMOR project was impacted. The latest published documentation of the overall project scope is outlined within the May, 2005 CIMOR Implementation Plan. The original contractors did not do a good job of maintaining a project plan, but when the DMH took over the management of the project they constructed a comprehensive project plan using Microsoft Project, and continued to maintain, update, and use that plan for activity and scope tracking up until the initial implementation of CIMOR. Shortly after that implementation in December 2006, the project management team became so intensively involved in problem resolution that they were unable to keep the project plan current. Since that time the changes to the project scope have not been well documented continuously within a project plan, project schedule, or project resource loading document as changes have occurred. There is no current overall picture or any process in place to enable project management and all the stakeholders to be made aware of the portions of the planned scope of work that have been completed to date. The documentation of the project scope does not include any explanation of the constraints and assumptions used to define the project scope.

7.4 Project Time Management

Timely completion of the project can be managed using techniques to identify all the activities that will be needed to complete the project and to accurately estimate the duration of those activities, their sequence, and the resources required.

The CIMOR project has had two major obstacles to managing the time and schedule. One obstacle has been the fact that for most of the development process the IT staff has not had an experience base for many of the development activities because this is their first time developing a system utilizing the platform, programming language, and architecture used in the CIMOR project. This has prevented them, especially early on in the project, from being able to make accurate estimates of time or resources required. The other obstacle has been the need to implement other major department initiatives during the course of the CIMOR project.

No formal project scheduling tool (e.g., MS Project) has been used since the CIMOR implementation to schedule resources or tasks. Rather, an MS Excel spreadsheet contains, among other information items, the estimated work effort, estimated percent complete, and completion date. The estimated percent complete has the following fixed values: 25%, 50%, 75%, and 100%. The percentage complete is recorded using 25% to represent the activity has started, 50% to indicate significant progress on the activity, and 75% to signify that testing has begun on the activity. A task is considered complete (i.e., 100%) when it has passed testing and before it is entered into the production environment.

No estimating methodology other than professional experience and best guess estimates are used to project the amount of work and elapsed time required for development activities. No metrics are consistently maintained to measure the quality of estimates to further improve the accuracy of future estimates.

Because MS Excel can perform neither resource loading nor dependency relationship scheduling and because no formal estimation methodology is utilized, DMH ITSD has difficulty establishing and accurately revising task estimated completion dates realistically and dependably. This combined with each developer having responsible for multiple CIMOR tasks results in completion dates being continually re-estimated. Any published completion dates are adjusted as required.

The problem of having to implement other system functions to support other major department initiatives compounds the difficulty of making estimates because of the continual need to revise the sequence of activities and to redirect the available personnel resources. Even though the Department has a good process for change control and prioritization of change requests, some change requests are given a mandated due date that does not take into consideration the resources available. DMH ITSD perceives that the current environment under which CIMOR personnel function creates a situation that requires mandated implementation dates to be more important than completing thorough testing.

The difficulty of projecting and maintaining a schedule of project activities, the continual need to make schedule revisions, and the need to devote IT staff primarily to direct development activities rather than planning and estimating activities has resulted in the IT department tending to operate in a more reactive rather than proactive mode.

7.5 Project Resource Management

DMH ITSD uses a MS Excel spreadsheet and BugTracker to manage the assignment of resources to program development tasks. No formal project scheduling tool (e.g., MS Project) is used to schedule resources or tasks. To expedite the development process and reduce administrative overheads, individual developers are assigned short tasks (i.e., less than 10 hours) for completion with a minimum of required formality. Because of the development teams experience levels, these tasks are completed without difficulty. However, along with these short tasks developers may also be assigned multiple enhancements, bugs, and project tasks any one of which may require more than 10 work hours. The individual developer manages his/her own time and task priorities.

Bugs are generally estimated to be 1 to 1 ½ days of effort. Enhancements and project tasks are usually discussed by two senior developers to consider complexities and approximate work effort. These two senior developers employ professional experience and best guess estimates to derive time estimates.

DMH ITSD perceives its actual development task time distribution is as follows:

- 70% to 80% of all tasks require less than 10 hours to complete
- 20% are between 40 and 50 hours
- A few tasks (usually bugs) are 100+ hours

In general the relative development task priority is project tasks followed by bugs followed by enhancements. All tasks in the project plan are considered high priority and are usually assigned to senior staff. Individual task priorities are usually determined with a scheme that considers:

- Issue severity
- Issue priority
- Development complexity

DMH ITSD has an internally developed bug tracking system named BugTracker. BugTracker has several "bug" and "enhancement" attributes that are assigned to each task tracked. These include the following:

- Business Value
- Time Sensitivity
- Clinical / Safety Value
- Scope Value
- Data Integrity
- Frequency

Each task tracked has an assigned composite score generated by an algorithm using both the 3 priority values and the 6 attribute values, which when evaluated generate a score. The maximum possible score is "50." In general all tasks having a score in the range 40 – 50 are addressed first.

7.6 Detailed Work Breakdown Structure

Over the last 12 months, the DMH IT staff have primarily used an Excel spreadsheet (CIMOR Completion Tracking Sheet) similar to a Gantt chart to plan and track project design activities. This sheet shows activities that either have minimum durations of approximately forty hours or are critical. The assigned resource, estimated total time, percent completed per week, and "go live" impact are data collected and maintained in the spreadsheet. Unlike a COTS project management tool, this spreadsheet does not show dependencies between activities, doesn't do resource loading, doesn't perform activity tracking of time spent per activity, doesn't establish a baseline plan of start and end dates, and doesn't show overdue completions. The CIMOR Completion Tracking Sheet is used primarily as a checklist of gross progress against a limited set of activities underway in the near term.

Development of a detailed work breakdown structure is essential to the development of an overall project plan and schedule, and the CIMOR Completion Tracking Sheet is inadequate for this purpose. All of the remaining work activities need to be broken down within each phase or function into the small packets of work that can be identified as individual tasks, and estimates

made for each of those of their duration and resource effort required to accomplish them. Any necessary sequencing, dependencies, prerequisites, and resource limitations of the activities need to be determined before organizing them into a complete outline of the project plan. Until that has been done to a high level of detail, it will not be possible to formulate a realistic schedule of the remaining portions of the project.

7.7 Communications Management

The CIMOR Implementation Plan of May 2005 outlined a plan for ongoing communication throughout the project. Email notices, the DMH Intranet, and the department's external web site were the planned methods. Project documentation and team meeting notes have been stored on the shared network folders established for the project. Monthly status meetings, periodic presentations, and web site notifications were planned to address all of the identified stakeholder groups.

The interaction between the Steering Committee, the Business Owners Group, and the DMH IT management in the ongoing execution of the change management process serves as the main process for the communication of planned project changes and implementation status. They are working towards a process of quarterly system change releases that incorporate a set of more major changes/enhancements in addition to the currently established weekly production system update. The Divisions are responsible for communicating with providers and notifying them of planned major system changes.

The CIMOR project team has developed a relatively refined process for the notification of planned weekly system changes to the production system. The development leader summarizes system changes that have been made via an email message to trainers or division contacts on Mondays that need to be tested before being moved into production on the following Thursdays. The help desk is notified of changes as well as the requestor of the system change. Users have access to the testing environment where the version of the system with the modified functionality resides between the time of the Tuesday notification of its availability and the Thursday system build process that will incorporate the change automatically into the production system barring receipt of any notification from users that it hasn't tested out correctly. Designated staff within both the IT and business user area conduct testing. Help desk staff perform a lot of testing of those published releases because they may be aware of the initially identification of the problem. The patches list and bug fixes are published on the website.

This process seems to work well to rapidly roll out production system fixes. However, the problems with this process are that a very short time is available to users to perform the test, little regression testing winds up being done, and it depends upon a user making a timely notification of any testing problems detected to halt the automated move of the system change to production. This default approval process can result in untested system changes being moved to the system.

7.8 Managing Stakeholder Expectations

Quality management is the set of processes necessary to ensure that the outcome of the project will satisfy the needs for which it was undertaken. This involves planning at the outset and as changes are introduced to establish the expected outcomes and to quantify the performance

measures of the resulting systems. The communication planning process must ensure that all stakeholders are in agreement about the expected outcome in order to avoid dissatisfaction.

One of the significant problems identified with the initial CIMOR implementation to the ADA providers was a gap between their expectations and the actual manner in which the system performed. Besides some actual system performance problems, there was also a disjoint between the system functionality and the functionality expected by the providers. This occurred despite delivery of quite comprehensive training on the use of the system in advance of the implementation.

Another common complaint heard by FOX by system users was that the users are not aware of the schedule of functional components that will be made available in future implementations of CIMOR. Publication of a high-level schedule and project plan to all stakeholders as well as notifications to changes to the schedule would help ameliorate much of the user dissatisfaction related to implementation timing.

7.9 Alignment with Industry Best Practices (PMI)

The State of Missouri's project management methodology for application development published by the ITSD within the "Project Management Best Practices" is in close alignment with the Project Management Institute (PMI) standards which are recognized as industry standards. The State's formal training for project managers is based closely on the Project Management Institute (PMI) standards. The State's formal training also requires continuing professional training as does the PMI.

The DMH IT staff have conducted the CIMOR project using several of the PMI and State recommended practices including work breakdown structures (the CIMOR Completion Tracking Sheet spreadsheet), risk management, a formal change management process, and a formal communication plan (copy to be provided). The project management has been overseen by a steering committee and more directly managed by an implementation team consisting of the Assistant IT Manager as project manager, the IT Director, and three management representatives from the business divisions. For five years of the CIMOR project there was also a contracted project oversight entity, CIBER, Inc., which conducted monthly process reviews and consultation regarding project management processes. All of these are in accordance with recognized industry best practices.

The State of Missouri's project management standards provide for a range of variability to the degree of applicability to projects because of the wide variety and size of systems expected to be developed utilizing them. For instance a large complex system with many stakeholders would require a more extensive and rigorous application of the standards than would a simpler system with limited stakeholders to be developed over a short time period. The CIMOR system development would certainly be considered a large and complex project which would require a rigorous application of the standards. However, the CIMOR project management has taken a more simplistic approach in the areas of project plan development, work activity breakdown, activity time estimating, scope management, activity tracking, risk management, and resource management. The CIMOR change control process, on the other hand, is fairly robust and structured. Overall, the CIMOR project has been conducted generally using industry best practices for project management but has not applied many of them to the degree of precision and intensity necessary for a project of this magnitude.

7.10 Recommendations for Future Improvements

- A work breakdown structure should be developed in much greater detail than has been done up to this point. This activity is an essential element of developing a viable project plan.
- A much more structured and formal process for the development and ongoing maintenance of a highly visible project plan is recommended. Having an up to date project plan showing the schedule of activities and the resources needed to staff them would help the Steering Committee and the Business Owners Group understand the potential impact of any changes or new program initiatives that are being considered. Establishing a dedicated project management office to maintain the project plan could ensure that the tracking of task completions and recording of progress against the plan do not contend with the work of actually performing and managing the tasks.
- The Business Owner Group and IT Steering Committee are very good practices for helping IT address the correct business needs. Those processes should be continued. The business owners need to improve the means of communicating the needs and concerns of the ultimate end users of the system especially the providers whose actions may directly impact consumers.
- Much more consideration of the needs of external system users needs to be factored into the planning and design of each system component. By continual communication of the progress of development and by involving those end users in the testing of the system and planning for training much of the dissatisfaction with the ultimate functionality of the system at the point of implementation may be reduced.

8 Risk Management

8.1 Risk Management Process

A formal risk management process is essential to any large project to help ensure its success by foreseeing potential problems and altering the course of the project to avoid them. The risk management process must be planned from the outset of the project to be utilized throughout the project. Resources must be planned to staff the process and to be available to implement the activities and recommendations resulting from the process. The process must be iterative, continually re-identifying new risks that appear and continually re-evaluating previously identified risks for changes in their potential for adverse impact.

As part of the review of the CIMOR project the risk management process was evaluated using the PMI project management practices as the accepted standard of practice. FOX found that a formal risk management process has been utilized throughout the CIMOR project management. Even though all risks have not been foreseen and avoided, the process that has been used is essentially in conformance with PMI recommended practices and is an actual functioning process rather than a paper documentation process.

8.1.1 Current Approach For Identifying Risks

Risk assessment is done by the CIMOR project team on a three month cycle. The three month interval for conducting a review of risks appears to be a target interval which may frequently go longer than three months. Within the context of one of the regularly scheduled project status meetings, the IT staff and the implementation team, and sometimes business representatives, try to foresee risks and itemize them in a spreadsheet. They then work together to establish a ranking score to determine the criticality of each itemized risk. The two factors used to determine the ranking factor are the estimated probability of the risk occurring and the estimated impact of the risk if it occurs. Each member of the group provides their estimate of those two factors for each identified risk. They use a scale of 0.1 (very low) to 0.9 (very high) as the range for estimates for each and rank them. The average of the members' estimates for each factor is used to multiply the two factors for each risk to provide a combined criticality ranking score.

8.1.2 Categories Of Risk

The CIMOR risk management process does not classify the identified risks into categories. All risks are handled within one grouping. Most of the identified risks on the project risk worksheets seen by FOX appear to represent risks to the technical, organizational, or project management conduct rather than risks to or from external stakeholders.

8.1.3 Risk Tracking And Reporting Capabilities

Excel spreadsheets and Word documents are used for tracking risks. The risk worksheets are reviewed periodically by the project work group.

8.1.4 Mitigation Strategies

The CIMOR project team develops a risk mitigation plan for the top five risks that have been ranked in the risk identification process. Addressing five risks appears to be an arbitrary number not related to the overall number of risks identified or to the number that have a high criticality score.

The types of actions that FOX has seen within the CIMOR mitigation plans have included changes to the schedule or sequence of project activities, revising the logic or processes to be incorporated into system components under development, purchasing new or additional tools or hardware, establishing additional monitoring and auditing processes, surveying user results of errors encountered, and planning to improve testing in targeted areas which contain high risk levels.

8.2 Comparison of Current Process to Industry Best Practices

The CIMOR project risk management process very closely aligns with the principles of risk management espoused by the PMI. Although utilizing a process that is closely in conformance with this industry standard process, the CIMOR project team has minimized their effort directed to risk management in some areas which has caused some problems. The risk management process cannot be entirely blamed for CIMOR's implementation problems, because even if risks are identified and mitigation plans are developed, the adverse impact to the project may still occur if the tools, resources, and time are not available to execute the mitigation.

The main aspects of the risk management process recommended by PMI are outlined below along with observations about how closely the CIMOR risk management process follows those concepts:

1. **Risk Management Planning –** This is the adoption of a strategy and process for recognizing and addressing risks which will be utilized throughout the duration of the project.
   - CIMOR project management developed their risk management process early in the project, and they have been utilizing it for the most recent years of the project.
2. **Risk Identification –** This is the process of determining what factors or possible events may cause an adverse result to the project.
   - The CIMOR team has used an established process for risk identification utilizing the implementation team consisting of IT and business owners.
   - The CIMOR process has not categorized the types and sources of risks which may have caused them to fail to include some of the risks to their external stakeholders which may have been a factor in dissatisfaction with the system expressed by some of those external stakeholders.
   - By not always conducting a formal re-evaluation of risks on their established timing intervals the CIMOR staff has sometimes reduced the effectiveness of their process.
   - Some of the risks that FOX saw listed on CIMOR risk worksheets actually represented problems that were already occurring at that point in time. Those should not be considered risks since they are virtual certainties.

3. **Qualitative Risk Analysis –** This is the process of prioritizing the identified risks taking into consideration their probability of occurring and their potential magnitude of impact if they do occur.
   - The CIMOR process is closely in alignment with the PMI-recommended process.
   - The CIMOR does not take into consideration the urgency or immediacy of risks which is a factor that may sometimes be considered in the qualitative risk analysis.
4. **Quantitative Risk Analysis –** This is the process of assigning numeric values to risks for use in the evaluation of their potential effect on the project.
   - The CIMOR process for quantifying the identified risks is straightforward and achieves the objective of providing a prioritized list of risks.
5. **Risk Response Planning –** This is the process of developing options and actions to avoid or reduce risks.
   - The process used in the CIMOR project is to plan a number of mitigation strategies directed toward either reducing the impact of the risk or reducing the likelihood of occurrence for each targeted risk. The types of actions that FOX has seen within the CIMOR mitigation plans have included changes to the schedule or sequence of project activities, revising the logic or processes to be incorporated into system components under development, purchasing new or additional tools or hardware, establishing additional monitoring and auditing processes, surveying user results of errors encountered, and planning to improve testing.
   - One significant shortcoming of the CIMOR risk response planning was the lack of any formal contingency plans having been developed for targeted risks or for high risk implementation points of the project.
6. **Risk Monitoring and Control –** This is the process of tracking and monitoring identified risks, continually identifying new risks, executing risk response plans, and evaluating their effectiveness.
   - The CIMOR team does appear to actually follow through with their planned mitigation strategies as planned. FOX was able to see that many of the planned actions from previous plans had been implemented or were in the process of being accomplished.
   - The CIMOR team does continually identify new risks and track and monitor previously identified risks.

8.3 Recommendations for Future

As a result of the review of the risk management process currently used within the CIMOR project, FOX would recommend the following changes:

- Instead of developing a mitigation plan for the top five ranked risks the project management should plan to address all the identified risks that have a criticality score above a specific level.
- Known problems that are already occurring should not be included in the list of risks, but they should be routed to an alternative process for problem resolution.

- Formal contingency plans should be developed for identified risks and for risk points during the project such as points of implementing significant changes or new replacement system functions.
- The three-month cycle between re-identification of risks is a relatively long period. The project management should make sure that the period does not go longer than that time period between re-identification of project risks.
- More consideration should be given to foreseeing potential risks to the external stakeholders during the risk identification process.

9 Review of CIMOR Implementation

The CIMOR implementation process raised concerns and questions, disrupted business processes, and created financial, staffing, and resource burdens on all parties involved. Some parts of the implementation process were well planned and deployed; others were implemented with little or no planning, notification, or testing. The Department, in keeping with Project Management best practices, therefore elected to interview ITSD, business owners and end users to look more closely at the implementation process and what went right and wrong so that the process could be improved in the future.

9.1 "Lessons Learned" from CIMOR Implementation

9.1.1 Facilitation Process

A facilitated session with DMH business owners, CIMOR users and IT implementers was conducted using a short set of questions to identify what did and did not work in the CIMOR implementation process and why, what lessons were learned in the process, and how it might be done differently as the project continues. Participants representing the DMH program areas and IT staff involved in CIMOR implementation were invited to participate in the facilitated sessions by CIMOR project staff.

9.1.2 Session Findings

Key issues during the initial CIMOR implementation phase that were expressed by participants during the facilitated session include the following:

- Lack of time—implementation was rushed
- Lack of sufficient testing and capability to conduct stress/load testing prior to implementation
- Lack of resources and funds
- Lack of staffing, particularly for IT development activities
- Underestimating project scope and extent of business needs
- Poor communication with end users and providers
- Training timing and accuracy
- Poor or incomplete planning and functional prioritization
- Priorities driven by business owners, primarily ADA, so that needs of other stakeholders were poorly addressed

Key "lessons learned" expressed by the participants include:

- Refocus on the consumer and service delivery
- Obtain comprehensive information on real business needs for all user groups before implementing or enhancing system functions
- Include provider participation on the CIMOR IT Steering Committee

- Involve all user groups, including providers, in setting priorities, and set up a process to provide equal system support for operational needs of each user group
- Conduct structured and adequate testing
- Develop a work plan using available resources
- Limit and plan development and changes to what is doable in short time frames, such as 3 to 4 months
- Create and follow a strong ongoing communications plan, including a public relations effort targeted to internal and external users and DMH executives
- Better documentation of system functionalities, screens, and HELP function
- Develop effective communications with DMH executives, and identify a CIMOR champion among executive management
- Minimize complexity in system where possible
- Maximize ongoing assistance available to users (training, help desk, better screen help, manuals, etc.)
- Provide more stability in system functions by limiting successive changes to the same functionalities outside of bug fixes or funding/legal requirements
- Phase in functionality or users to smooth transition and minimize disruptions when expanding the user base
- Put parameters on system scope, but provide a way to capture and evaluate newly identified needs

Major items identified that went well or likewise didn't go well ranged from broad implementation areas to very specific functions or activities. A number of key activities got both positive and negative reviews for specific aspects. For example:

- CIMOR training was highly rated for the effort that went into developing the training, for the amount and usefulness of materials produced, and for efforts made to make it available in many forms. What hurt the training effort was the timing−too far away from implementation−and the fact that a few of the screens that were covered in the training did not match the actual system screens by the time implementation occurred.
- Communication within parts of DMH during the process, such as within IT and with various programs and parts of the department that did not normally communicate, was felt to be reasonably good or at least measurably improved over the norm, but some communications, particularly with external providers, were less effective and fell off over time, and implementation time pressures forced many communications, or timely communications, off the table.

Some activities that went well happened largely as a result of knowledgeable and dedicated staff and contractors that put in extra time and effort to make things work and ready on time. IT staff worked long hours to make the screens and functions workable before deployment. DMH program staff had to quickly learn the system so they could help providers when they called in for assistance using the system. The ADA division was able to ramp up staffing to be able to handle the increased caller load other divisions lacked resources. The training was felt to be well documented and very oriented towards real user needs.

Some CIMOR implementation activities were perceived as not going well and were negatively affected by external pressures not under the control of the implementation team. These included management decisions, such as:

- Resource and staffing cuts to IT
- Management defined, non-negotiable deadlines for CIMOR “go live” implementation date

As a result, the system was implemented when not all functions were complete or fully tested, putting a burden on users to work with a rough system, and essentially testing the system through actual use. Consequently, IT was forced to fix system bugs as quickly as possible and this became their first priority so that providers could use CIMOR to perform essential service and operational activities.

Program decisions also negatively impacted CIMOR implementation, such as:

- Implementing new program requirements and business rules unannounced, causing massive billing rejections
- Giving greater priority to business owner and program operational needs than to provider and clinical/service delivery needs

These types of issues result from different perspectives and uses of the system by different users and may only be able to be minimally impacted by the implementation team. Therefore may not disappear in future phases no matter how much planning and preparation is done. Consistent upper management support, availability of resources and competent staffing, good communication and reasonable deadlines are necessary for a successful project. Disruptions in any of these elements can, however, be anticipated and somewhat factored into the planning process by providing comfortable timelines, clearly defining and remaining within project scope, maximizing estimates of staff time needed to continue work on CIMOR, planning for interruptions for other priorities, and working through issues in the planning stage rather than in the development phase.

Certain issues with the initial implementation phase of CIMOR should not occur again. Items such as merging and converting data histories from disparate systems, the huge learning curve required for many users when moving from old legacy interfaces to a web system; training on a new system still under development; and developing CIMOR on a learn-as-you-go model should not occur or be greatly minimized in further development of the CIMOR system.

9.2 Industry Best Practice Strategies for Future Implementations

As a result of conducting this session, the following inferences were made regarding future implementations:

- Improving future implementation of new capabilities and enhancements to CIMOR requires greater efforts around testing, training, communicating, and planning.
- Planning and using a prioritized, phased in approach for enhancements to CIMOR would make the project more manageable and allow communications to be more specific and timely.
- Setting predetermined activities to be completed during a specified time period (e.g., quarterly) can help the project proceed in a more logical progression.

- Additionally, consideration of, and setting priorities for, the benefit of all stakeholders will improve stakeholder perceptions of CIMOR.
- Focusing system functionalities on clinical and service needs will not only improve provider perceptions but will also provide the greatest benefit to consumer care and treatment.

Some ancillary activities should be commenced in the near term to make CIMOR more usable, more user-friendly, and provide real integration and implementation benefits. A major activity that would go a long way to improving the usability of the information in CIMOR is to create more integration and standardization across programs and operations, and not just in the system. Examples of these activities include synchronizing, simplifying and consolidating program needs and business rules; standardizing and consolidating operating processes and procedures wherever possible; standardizing data elements and definitions across programs and legacy systems; simplifying user screens and creating an intuitive process flow.

The lessons learned gleaned from the session and identified above in Section 9.1.2 would be examples of best practices for ITSD to consider for future implementation projects. Sections 7 and 8 provide a discussion of how these strategies align with PMI, Missouri State standards and other industry best practices.

Appendix A

Missouri Department of Mental Health
INFORMATION TECHNOLOGY SERVICES DIVISION

ITSD Management Interview Introduction

* * * * * *

Fox Systems, Inc. (FOX) is under contract to the Missouri Department of Mental Health (DMH) to conduct an independent assessment of the Customer Information Management, Outcomes, and Reporting (CIMOR) system and the department's future information system needs.

As part of the assessment, FOX consultants will be scheduling a 1 hour interview with the department's management staff. The objective of these interviews is to identify current goals, objectives, and business processes and to determine how well CIMOR (e.g., strengths and weaknesses) is meeting DMH's information system needs. The FOX consultants will also be asking questions about support to DMH and its programs, and your vision regarding how DMH will be supported five to ten years from now. The objective of these questions is to identify for DMH the current status of ITSD and CIMOR as well as ITSD's vision of the future.

Toward this end you have been identified by DMH as a primary ITSD decision maker whose responsibilities significantly impact DMH's ability to accomplish its mission. Your responses to this survey's questions will be vital in shaping an accurate environmental picture of CIMOR's current and future role as the primary system supporting your business needs.

FOX consultants are providing the survey in advance of the interview to allow you time to consider your needs and provide an opportunity for you to discuss the project others within your organization. *You do not have to complete the survey prior to the interview*. We will record your answers during the interview and provide you with an opportunity to edit the responses.

All information sources will be reviewed, analyzed, and summarized into a report presented to DMH.

Name:	Date:
Title	Area of Responsibility:
Phone:	Email:
Direct Subordinates for Follow-up:	

The FOX Missouri Project Manager on site is Mary Jane Teirumniks. Ms. Teirumniks is happy to answer any questions you may have about the project or this survey. She may be reached at 317.509.3829 (cell).

Thank you for your participation. Your opinions are important.

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Missouri Department of Mental Health
INFORMATION TECHNOLOGY SERVICES DIVISION

ITSD Management Interview

* * * * * *

1. **Please state the primary function(s) of the organization / technical unit for which you have responsibility.**

2. **Please list the applications systems for which you have responsibility.**

3. **Please identify the DMH healthcare programs completely (i.e., 100%) supported by CIMOR.**

4. **Please identify the DMH healthcare programs partially (i.e., less than 100%) supported by CIMOR.**

Continued on next page

5. **Please identify the DMH healthcare programs that are not supported in any way by CIMOR.**

6. **Please identify the project management standards currently used for managing CIMOR and CIMOR related projects. Please provide FOX a copy of them or read access to them. Please summarize the current standards used.**

7. **Please identify the project scheduling tool currently used to schedule CIMOR and CIMOR related projects. Please provide FOX a copy of it or read access to it. Please describe the tools capabilities and how it is currently used.**

8. **Please describe the project test standards currently used for managing CIMOR and CIMOR related projects. Please provide FOX a copy of them or read access to them. Please summarize the current standards used.**

9. **Please describe the change management standards currently used for managing CIMOR and CIMOR related projects. Please provide FOX a copy of them or read access to them. Please summarize the current standards used.**

Continued on next page

10. **Please describe the risk management standards currently used for managing CIMOR and CIMOR related projects. Please provide FOX a copy of them or read access to them. Please summarize the current standards used.**

11. **Please describe the hardware architecture used for CIMOR. Why was this particular architecture selected? Please provide FOX with a detailed hardware configuration description and diagram.**

12. **Please describe the software architecture used for CIMOR. Why was this particular architecture selected? Please provide FOX with a detailed software configuration description and diagram.**

13. **Please state the total number of current CIMOR users. Of this number please specify the current number of internal DMH CIMOR users. Of the total number of current CIMOR users, please specify the current number of external DMH CIMOR users.**

14. **Please identify the DMH Divisions currently using CIMOR. Please describe who in these Divisions (internal and external) use CIMOR and what business functions they perform.**

Continued on next page

15. **Please identify the DMH Divisions that are currently NOT using CIMOR. Please summarize why they are not using CIMOR.**

16. **Please state what your users see as CIMOR's strengths. (To be complete, please use extra pages if necessary.)**

17. **Please state what your users see as CIMOR's weaknesses. (To be complete, please use extra pages if necessary.)**

18. **In your opinion would it be better to enhance CIMOR or completely replace it with a new system? Why?**

19. **Please list any existing commercially available packages that could replace CIMOR in your opinion.**

Continued on next page

20. Please state the current process used to inform your users of CIMOR system changes. Please summarize what your users think of this process.

21. Please describe how your users were / are involved in testing CIMOR.

22. From your perspective please state what you see as CIMOR's strengths. (To be complete, please use extra pages if necessary.)

23. From your perspective pleases state what you see as CIMOR's weaknesses. (To be complete, please use extra pages if necessary.)

24. Please state the extent to which ITSD is in compliance with HIPAA requirements including security, privacy, transactions and code sets, and NPI? (To be complete, please use extra pages if necessary.)

Continued on next page

25. Carefully read each of the following statements, and please indicate your level of agreement by checking (✓) the most appropriate box.

Statement	Strongly disagree 1	2	Neither agree nor disagree 3	4	Strongly agree 5
1. CIMOR meets user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
2. CIMOR data responses are correct.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
3. CIMOR is available when users need it.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
4. CIMOR response time meets user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
5. Users find CIMOR easy to use.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
6. The CIMOR Help Desk provides the assistance users need.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
7. The CIMOR Help Desk provides timely responses.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
8. The CIMOR Help Desk's responses are relevant to user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
9. The CIMOR Help Desk is knowledgeable about user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
10. The CIMOR Help Desk treats users with respect.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
11. The CIMOR Help Desk is friendly to users.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
12. The process used to inform users of CIMOR system changes currently meets users' business needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
13. The level of CIMOR testing prior to initial implementation met users' business needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
14. The current level of CIMOR testing prior to implementing system changes meets users' business needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
15. CIMOR helps users perform their job functions.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
16. CIMOR helps users improve healthcare delivery.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
17. CIMOR hinders healthcare delivery.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
18. Overall users are satisfied with CIMOR.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

26. Please describe any problems encountered during the CIMOR implementation. In your opinion what do believe caused these problems.

Continued on next page

27. Please describe any data conversion problems encountered during the CIMOR implementation. In your opinion what do believe caused these problems.

28. Please state anything else that in your opinion FOX should know?

Thank you for participating. Your opinions are important.

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Missouri Department of Mental Health
INFORMATION TECHNOLOGY SERVICES DIVISION

Executive Management Interview Introduction

* * * * * *

Fox Systems, Inc. (FOX) is under contract to the Missouri Department of Mental Health (DMH) to conduct an independent assessment of the Customer Information Management, Outcomes, and Reporting (CIMOR) system and the department's future information system needs.

As part of the assessment, FOX consultants will be scheduling a one-hour interview with each of the department's executive staff. The objective of these interviews is to identify current goals, objectives, and business processes and to determine how well CIMOR (e.g., strengths and weaknesses) is meeting your division's information system needs. The FOX consultants will also be asking questions about the future of DMH and its programs, and your vision regarding where the programs will be five to ten years from now. The objective of these questions is to identify for DMH what system functionality will be needed to support the Department's mission in the future.

Toward this end you have been identified by DMH as a primary decision maker whose responsibilities significantly impact DMH's ability to accomplish its mission. Your responses to this survey's thirteen questions will be vital in shaping an accurate environmental picture of DMH's operations and CIMOR's current and future role as the primary system supporting your business needs.

FOX consultants are providing the survey in advance of the interview to allow you time to consider your program's needs and provide an opportunity for you to discuss the project and future system needs with other managers within your division. *You do not have to complete the survey prior to the interview.* We will record your answers during the interview and provide you with an opportunity to edit the responses.

All information sources will be reviewed, analyzed, and summarized into a report presented to DMH.

Name:	Date:
Title	Area of Responsibility:
Phone:	Email:
Direct Subordinates for Follow-up:	

The FOX Missouri Project Manager on site is Mary Jane Teirumniks. Ms. Teirumniks is happy to answer any questions you may have about the project or this survey. She may be reached at 317.509.3829 (cell).

Thank you for your participation. Your opinions are important.

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FOX Systems, Inc.

Missouri Department of Mental Health
INFORMATION TECHNOLOGY SERVICES DIVISION

Executive Management Interview

* * * * * *

1. **Please state the primary function(s) of the organization / business unit for which you have responsibility.**

2. **Please describe your organization's reporting structure.**

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3. **Please describe the most pressing information issue facing your organization in your opinion.**

4. **Please list the information you need from others that you are currently unable to access. Also, please describe how your unit gets the information currently.**

5. **Please list the information requests you receive to which you have difficulty providing a response.**

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6. **Please describe any new technology (e.g., imaging, workflow management, document management repository, fax server, etc.) that if made available would be helpful to your unit in performing its functions more efficiently.**

7. **Please list any specific risks you have identified for your unit (e.g., increased number of users could impact response time, data conversion issues).**

8. **Please list any current or emerging State initiatives focused around Medicaid or Department of Health and Senior Services which may affect your agency and CIMOR.**

Continued on next page

9. Please list any "Mental Health Reform" efforts currently being considered by the State. Please state the key elements of each.

Mental Health Reform	Key Elements
1.	
2.	
3.	
4.	
5.	

10. Please state *your vision* as to where the Missouri Department of Mental Health Programs will be in *five (5)* years.

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11. Please state *your vision* as to where the Missouri Department of Mental Health Programs will be in *ten (10)* years.

12. Please list any other potential or planned policy, reimbursement, financing, benefit package/services, contracting, administrative, or delivery model changes that are being considered and that will require systems support and reporting.

13. Please list any state-level Information Technology initiatives involving new enterprise systems and standards which are being adopted or are under consideration (e.g., Service Oriented Architecture (SOA), Electronic Health Records, etc.).

Thank you for participating. Your opinions are important.

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FOX Systems, Inc.

Missouri Department of Mental Health

INFORMATION TECHNOLOGY SERVICES DIVISION

Business Owner Interview

* * * * * *

Fox Systems, Inc. (FOX) is under contract to the Missouri Department of Mental Health (DMH) to conduct an independent assessment of the Customer Information Management, Outcomes, and Reporting (CIMOR) system and the department's future information system needs.

As part of the assessment, FOX consultants will be scheduling a one-hour interview with some of the department's management staff. The objective of these interviews is to identify current goals, objectives, and business processes and to determine how well CIMOR (e.g., strengths and weaknesses) is meeting your division's information system needs.

Toward this end you have been identified by DMH as a manager knowledgeable of CIMOR and its capabilities and how the system impacts your business unit. Your responses to this survey's questions will be vital in shaping an accurate environmental picture of DMH's operations and CIMOR's current and future role as the primary system supporting your business area's needs.

FOX consultants are providing the survey in advance of the interview to allow you time to consider your program's needs and provide an opportunity for you to discuss the project and future system needs with others within your division. *You do not have to complete the survey prior to the interview.* We will record your answers during the interview and provide you with an opportunity to edit the responses.

All information sources will be reviewed, analyzed, and summarized into a report presented to DMH.

Name:	Date:
Title	Area of Responsibility:
Phone:	Email:
Direct Subordinates for Follow-up:	

The FOX Missouri Project Manager on site is Mary Jane Teirumniks. Ms. Teirumniks is happy to answer any questions you may have about the project or this survey. She may be reached at 317.509.3829 (cell).

Thank you for your participation. Your opinions are important.

Fox Systems, Inc.

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FOX Systems, Inc.

Missouri Department of Mental Health
INFORMATION TECHNOLOGY SERVICES DIVISION

Business Owner Interview

* * * * * *

1. Please state the primary function(s) of the organization / business unit for which you have responsibility.

2. At how many physical geographical location(s) does your business unit staff use CIMOR (e.g., Jefferson City)? Where are they located?

physical geographical location(s)

Locations:

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

3. Regarding the individuals in Question #2, please summarize how they use CIMOR in the course of carrying out their job responsibilities.

Continued on next page

4. Please review the following list of business functions currently processed in CIMOR.

For each of the business functions your business unit currently uses please indicate your level of agreement with the following statement by checking (✓) the most appropriate box.

"CIMOR currently meets my business unit's business needs."

(Please do not mark any response for those functions you do not use.)

CIMOR currently meets my business unit's business needs with this business function.	Strongly disagree 1	2	Neither agree nor disagree 3	4	Strongly agree 5
1. Access to Recovery (ATR)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
2. Accounts Payable (Adjudication)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
3. Accounts Receivable (Claims Processing)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
4. Administration (code tables and setups)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
5. Assessments	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
6. Authorization/Request/Approval/Review	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
7. Benefit Eligibility	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
8. Case Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
9. Claims Adjudication and Payment	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
10. Claims Data Entry and Capture	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
11. Claims Error Resolution	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
12. Clinical Intake Screening	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
13. Complex Allocation Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
14. Consumer Banking	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
15. Consumer Demographics	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
16. Contact Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
17. Co-Pays that are not ATP	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
18. Delivered Services (Encounter Data Entry)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
19. Diagnosis	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
20. DMH Intra-agency Communication	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
21. Eligibility Maintenance	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
22. Episode of Care/Commitments/Court Orders	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
23. Fiscal Intermediary	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
24. HIPAA Transaction Translation	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
25. HIPAA/EDI Trading Partner Maintenance and Certification	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
26. Human Resource Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
27. Incident Tracking & Reporting	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
28. Medical Record Maintenance	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Continued on next page

CIMOR currently meets my business unit's business needs with this business function.	Strongly disagree 1	2	Neither agree nor disagree 3	4	Strongly agree 5
29. Medicare, Medicaid, and Private Insurance	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
30. MRDD Independent Supported Living (ISL) Budgets	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
31. Organization Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
32. Outcomes	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
33. Payer Plans	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
34. Practitioners	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
35. Prioritization in applying Standard Means Test (SMT)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
36. Property/Bed Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
37. Provider Rate-setting	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
38. Provider/Contract Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
39. Registration/Admission/ Program Assignment	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
40. Sam II Link/SAM II HR Link	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
41. Standard Means Test (SMT) applied as serviced are delivered	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
42. Substance Abuse Traffic Offenders Program (SATOP)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
43. Supported Community Living, used by both CPS and MRDD	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
44. Third Party Liability (TPL)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
45. Utilization Review	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
46. Waiting Lists	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

5. Please list any additional systems or applications your business unit requires to accomplish its mission. Please name and state the functionality used.

6. Please state why these business functions in Questions #5 are not in CIMOR.

Continued on next page

7. **Please list any additional information (i.e., data elements) that should be in CIMOR that would better help your business unit accomplish its mission. Please also state who creates this information. How would you use this information if were available in CIMOR?**

8. **Please state the current process used to inform your unit of CIMOR system changes.**

9. **Please describe how your business unit was / is involved in testing CIMOR.**

10. **Please list any special condition(s) associated with your business unit that impact CIMOR (e.g., new business rules will be added).**

11. **From your perspective, please state what you see as CIMOR's strengths. (To be complete, please use extra pages if necessary.)**

12. **From your perspective, please state what you see as CIMOR's weaknesses. (To be complete, please use extra pages if necessary.)**

Continued on next page

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13. Carefully read each of the following statements, and please indicate your level of agreement by checking (✓) the most appropriate box.

Statement	Strongly disagree 1	2	Neither agree nor disagree 3	4	Strongly agree 5
1. CIMOR meets user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
2. CIMOR data responses are correct.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
3. CIMOR is available when users need it.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
4. CIMOR response time meets user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
5. Users find CIMOR easy to use.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
6. The CIMOR Help Desk provides the assistance users need.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
7. The CIMOR Help Desk provides timely responses.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
8. The CIMOR Help Desk's responses are relevant to user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
9. The CIMOR Help Desk is knowledgeable about user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
10. The CIMOR Help Desk treats users with respect.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
11. The CIMOR Help Desk is friendly to users.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
12. The process used to inform users of CIMOR system changes currently meets users' business needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
13. The level of CIMOR testing prior to initial implementation met users' business needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
14. The current level of CIMOR testing prior to implementing system changes meets users' business needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
15. CIMOR helps users perform their job functions.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
16. CIMOR helps users improve healthcare delivery.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
17. CIMOR hinders healthcare delivery.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
18. Overall users are satisfied with CIMOR.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

14. In your opinion would it be better to enhance CIMOR or completely replace it with a new system? Why?

Continued on next page

15. Please list any existing commercially available packages that could replace CIMOR in your opinion.

16. Please describe any new technology (e.g., imaging, workflow management, document management repository, fax server, etc.) that if made available would be helpful to your unit in performing its functions more efficiently.

17. Please state anything else that in your opinion FOX should know?

Thank you for participating. Your opinions are important.

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Missouri Department of Mental Health
INFORMATION TECHNOLOGY SERVICES DIVISION

CIMOR Provider Interview

* * * * * *

Fox Systems, Inc. (FOX) is under contract to the Missouri Department of Mental Health (DMH) to conduct an independent assessment of the Customer Information Management, Outcomes, and Reporting (CIMOR) system and the department's future information system needs.

As part of the assessment, FOX consultants will be scheduling a one- to two-hour interview with healthcare providers. The objective of these interviews is to gain an understanding of your billing processes and to determine how well CIMOR (e.g., strengths and weaknesses) is meeting your organization's information system needs.

The study's objective is to help DMH better plan CIMOR's crucial future role in helping DMH carry out its mission. Toward this end you have been identified by DMH as a primary, knowledgeable individual regarding CIMOR and whose responsibilities make you keenly aware of how well CIMOR currently operates.

FOX consultants are providing the survey in advance of the interview to allow you time to consider whether features and system capabilities are meeting your organization's needs for submission of claims transactions. *You do not have to complete the survey prior to the interview*. We will record your answers during the interview and provide you with an opportunity to edit the responses.

FOX will collect this survey and other information. All information sources will be reviewed, analyzed, and summarized into a report presented to DMH.

Name:	Date:
Title	Area of Responsibility:
Phone:	Email:
Direct Subordinates for Follow-up:	

The FOX Missouri Project Manager on site is Mary Jane Teirumniks. Ms. Teirumniks is happy to answer any questions you may have about the project or this survey. She may be reached at 317.509.3829 (cell).

Thank you for your participation. Your opinions are important.

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FOX Systems, Inc.

Missouri Department of Mental Health
INFORMATION TECHNOLOGY SERVICES DIVISION

CIMOR Provider Interview

* * * * * *

1. Please state the types of services your organization provides to DMH consumers.

2. Please state the number of DMH consumers for whom you have treatment responsibilities.

number of Missouri Department of Mental Health (DMH) healthcare consumers

3. Please state your average monthly billings to DMH for the healthcare needs of the consumers in Question #2.

average monthly billings to DMH

4. Please provide a best guess estimate of the number of people in your organization who actually use CIMOR in the course of their daily activities.

number of people who use CIMOR

5. At how many physical geographical location(s) does your business unit staff use CIMOR (e.g., Jefferson City)? Where are they located?

physical geographical location(s)

Locations:

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

Continued on next page

6. Regarding the people in Question #4, please summarize how they use CIMOR in the course of carrying out their job responsibilities.

_____

_____

_____

_____

_____

7. Please review the following list of business functions currently processed in CIMOR.

For each of the business functions your organization currently uses please indicate your level of agreement with the following statement by checking (✓) the most appropriate box.

"CIMOR currently meets my organization's business needs."

(Please do not mark any response for those functions you do not use.)

CIMOR currently meets my business unit's business needs with this business function.	Strongly disagree 1	2	Neither agree nor disagree 3	4	Strongly agree 5
1. Access to Recovery (ATR)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
2. Accounts Payable (Adjudication)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
3. Accounts Receivable (Claims Processing)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
4. Administration (code tables and setups)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
5. Assessments	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
6. Authorization/Request/Approval/Review	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
7. Benefit Eligibility	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
8. Case Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
9. Claims Adjudication and Payment	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
10. Claims Data Entry and Capture	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
11. Claims Error Resolution	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
12. Clinical Intake Screening	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
13. Complex Allocation Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
14. Consumer Banking	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
15. Consumer Demographics	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
16. Contact Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
17. Co-Pays that are not ATP	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
18. Delivered Services (Encounter Data Entry)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
19. Diagnosis	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
20. DMH Intra-agency Communication	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
21. Eligibility Maintenance	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
22. Episode of Care/Commitments/Court Orders	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Continued on next page

CIMOR currently meets my business unit's business needs with this business function.	Strongly disagree 1	2	Neither agree nor disagree 3	4	Strongly agree 5
23. Fiscal Intermediary	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
24. HIPAA Transaction Translation	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
25. HIPAA/EDI Trading Partner Maintenance and Certification	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
26. Human Resource Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
27. Incident Tracking & Reporting	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
28. Medical Record Maintenance	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
29. Medicare, Medicaid, and Private Insurance	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
30. MRDD Independent Supported Living (ISL) Budgets	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
31. Organization Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
32. Outcomes	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
33. Payer Plans	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
34. Practitioners	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
35. Prioritization in applying Standard Means Test (SMT)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
36. Property/Bed Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
37. Provider Rate-setting	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
38. Provider/Contract Management	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
39. Registration/Admission/ Program Assignment	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
40. Sam II Link/SAM II HR Link	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
41. Standard Means Test (SMT) applied as serviced are delivered	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
42. Substance Abuse Traffic Offenders Program (SATOP)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
43. Supported Community Living, used by both CPS and MRDD	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
44. Third Party Liability (TPL)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
45. Utilization Review	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
46. Waiting Lists	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

8. Please describe the data your organization inputs to CIMOR. Please describe how you use this data.

Continued on next page

9. Please describe the data your organization obtains from CIMOR. Is the data received reliable?

10. From your perspective, please state what you see as CIMOR's strengths. (To be complete, please use extra pages if necessary.)

11. From your perspective, please state what you see as CIMOR's weaknesses. (To be complete, please use extra pages if necessary.)

12. In your opinion would it be better to enhance CIMOR or completely replace it with a new system? Why?

13. Please list any existing commercially available packages that could replace CIMOR.

14. Please list any special condition(s) associated with CIMOR that impact your organization (e.g., corporate procedures require all claims to be filed within a single 24 hour window).

Continued on next page

15. Please list any special condition(s) associated with your organization that impact CIMOR (e.g., your organization has so many users they cannot all login to CIMOR).

16. Please state the current process used to inform you of CIMOR system changes.

17. Please describe how your business unit was / is involved in testing CIMOR prior to implementation of system changes.

18. Please describe the initial training you received prior to using CIMOR. Please describe any ongoing training support available to you.

19. Please describe the information you must collect prior to submitting a claim to CIMOR.

Continued on next page

20. Carefully read each of the following statements, and please indicate your level of agreement by checking (✓) the most appropriate box.

Statement	Strongly disagree 1	2	Neither agree nor disagree 3	4	Strongly agree 5
1. CIMOR meets user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
2. CIMOR data responses are correct.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
3. CIMOR is available when users need it.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
4. CIMOR response time meets user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
5. Users find CIMOR easy to use.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
6. Users find entering a claim into CIMOR easy.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
7. Users find it easy to obtain the status of a claim.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
8. Claims submitted to CIMOR are processed timely.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
9. CIMOR contains claim edits.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
10. When a claim fails an edit, users may easily correct it prior to claims submission.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
11. CIMOR reports provide all information needed to track and report on outstanding claims.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
12. CIMOR provides sufficient capabilities to reconcile claims billed to claims paid.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
13. The CIMOR Help Desk provides the assistance users need.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
14. The CIMOR Help Desk provides timely responses.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
15. The CIMOR Help Desk's responses are relevant to user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
16. The CIMOR Help Desk is knowledgeable about user needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
17. The CIMOR Help Desk treats users with respect.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
18. The CIMOR Help Desk is friendly to users.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
19. The process used to inform users of CIMOR system changes currently meets users' business needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
20. The level of CIMOR testing prior to initial implementation met users' business needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
21. The current level of CIMOR testing prior to implementing system changes meets users' business needs.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
22. CIMOR helps users perform their job functions.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
23. CIMOR helps users improve healthcare delivery.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
24. CIMOR hinders healthcare delivery.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
25. Overall users are satisfied with CIMOR.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Continued on next page

21. Please describe other claims billing or processing situations that in your opinion FOX should know?

22. Please state anything else that in your opinion FOX should know.

Thank you for participating. Your opinions are important.

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